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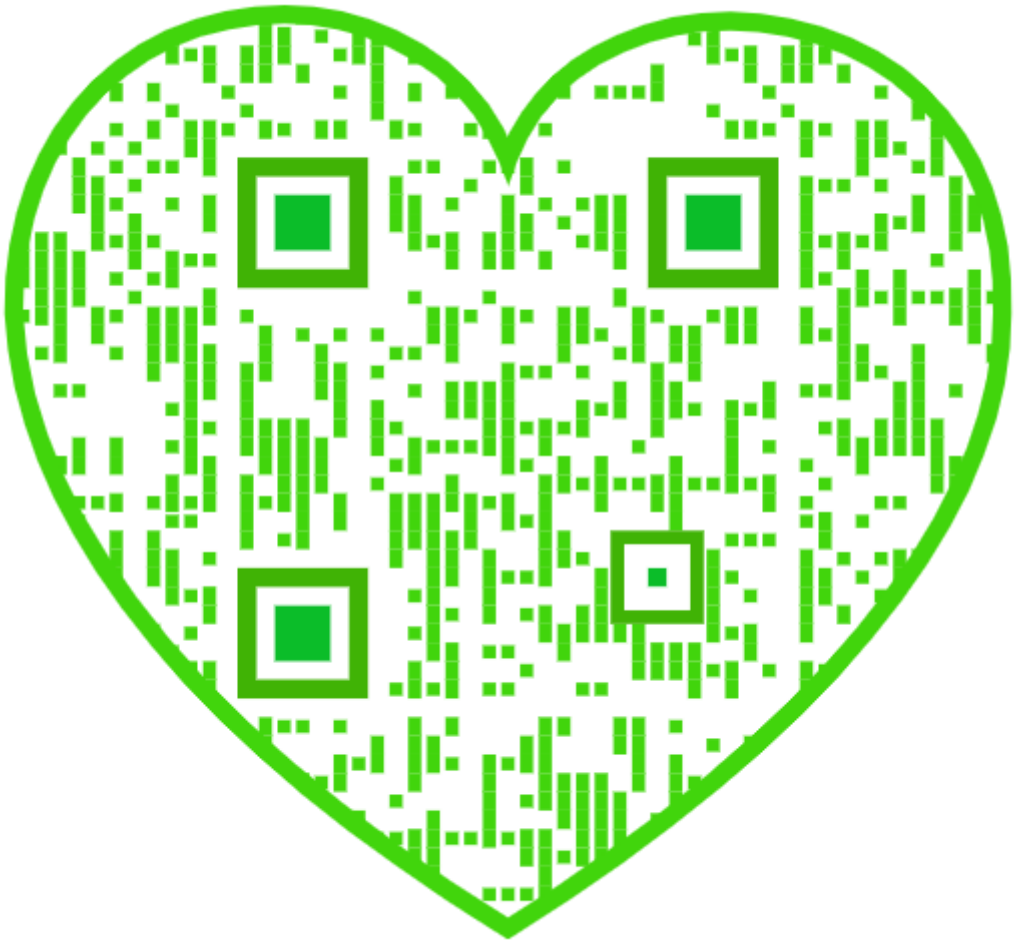

STUDIES OF SHADE TREES IN CALIFORNIA

A Thesis submitted in partial satisfaction
of the requirements for the degree of

Bachelor of Science

By

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Approved:
H. M. Hall
Instructor in charge
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CHAPTER I.

The spirit of the twentieth century, by popular consent, is one of progress. Progress strides forward only by measures of law and order. This is inevitable, else she would defeat herself by her own struggles.

There was a time when cities grew up as they would, but now they are being planned. Progress has set the irrevocable stamp of her disapproval on all haphazard procedure. To be sure, there are still flagrant violations of this new idea and many cities that might easily remodel their plans, are wilfully negligent and still more cities are blocking the efforts of their own enthusiasts by stubbornly refusing any cooperation among the members of their community.

And this lack of interest arises in most cases from a doubtless sincere conviction that civic beautification is a waste of money. It has been demonstrated and can be demonstrated times without number, if proper methods are followed, that civic improvement is one of the best and biggest factors of community life. First of all there is a large rise in the value of real estate. This of course, is partly due to the cost and hence the value of the improvements, but aside from the additional expense, there is a value put upon those intangible things which are expressed in the new atmosphere of elegance and refinement. And this same atmosphere which is appreciated for its direct influences upon money matters, has an uplifting influence upon the citizens which is rarely appreciated until it is removed. And anything which, in any way, is of value in raising human standards and ideals, is surely worthy of unbiased consideration. When these direct and indirect effects of civic improvement are fully advertised; when public opinion has fully realized that they are for thepublic and that the expense of their production can be reduced to a minimum; and when these matters shall be entrusted to experts to handle, then we shall have sufficient and valuable legislation, a hearty support from everyone and a healthy civic pride which will mean success to

any community.

But to come to the phase of the problem that most directly concerns us here, let us turn to the planting which is done along the streets and highways of our state. With certain exceptions for which due credit must be given, we find a supreme lack of order throughout the planting which has been done already.

To some minds there is the open question of the desirability of planting of any sort. There are some localities where it is seriously stated that trees are not desired. In one city that comes to mind, it was urged that the summer temperature was so low, and the prevalence of fogs so great, that trees would be a menace to health. But at this point one might suggest that there are trees and trees. There are species which are undeniably objectionable for excessive shade; but there are also trees whose shade amounts to almost no thing. There are others whose form would destroy all air currents in any street particularly in a narrow one, but there are yet others which would never branch across the street at any age. Again the method of planting would effect this matter of light and air.

Then aside from the eminently essential question of health, we have the no less vital, if somewhat less appreciated point of aesthetics. To the average mind there is a certain stimulation to be gained from the consideration of any noble work well done. The tree, as it stands perfect in detail and form expressing an individuality as striking as any human being, is an inspiration to every beholder. Aside from the beauty of a tree as a unit, there is a still greater charm when it takes its place in the great scheme of a well executed planting. The absence of trees and the sense of bareness is a proverbial co-ordination in the present day mind. The ever-quoted examples of Washington and Paris furnish the most striking instances of well planned and well executed plantings. It is a wonderful and inspiring sight to look down long avenues and there see plantings of trees which extend several miles and give promise of becoming the pride and admiration of generations to come.

We have earnestly believed and do believe that there is perhaps no one thing that may appear in any city that so adds to its finished appearance or to

its refinement as a well planned and well executed planting of trees along its streets. Above all things else, let the plan be good.

The logical outcome of any plan, of any good plan, is unity. Do not imagine that uniformity means the restriction to a single tree, so that wherever one would look that tree would dominate the landscape. Such a proceeding would violate the much abused and yet often neglected principle of variety. But the concensus of opinion demands that the uniform work should be strictly adhered to for each street in towns and cities. In the country more latitude is permissible. (There are some valid arguments against this, of which more hereafter). The desirability of this, is most evident when one considers the results now seen. In a certain city, where up to the present time all planting has been at the discretion or better notion of the property holders, some queer combinations arise. For example, the east side of one block shows, - one chamaerops, one oleander, one chamaerops, six white elms, six liriodendrons, one vacant lot, two umbrella trees, four silver maples, a Canary Island date palm and a walnut! Across from this mixture there are but twelve trees, - two umbrellas, four chamaerops palms and six elms. Another characteristic lot runs like this : four grevilleas, two walnuts, six lindens, vacant lot, two big leaf maples and four lindens. While across the street are two silver maples, two horse chestnuts, two elms, six blank, four hawthornes and two elms. Imagine, if you can, any symmetry or satisfaction in this young nursery. Here we have a variety with a Vengeance, but no trace of Unity or Coherence.

If we were to analyze the conditions on that block, we should find that there we have the following state of affairs:-

1. One evergreen against six deciduous species.
2. Four unplanted lots, offering at least four chances for new species and time of planting.
3. Two short lived species against five medium and long.
4. One globular dwarf; four medium globular; one even-shaped; and two straggling.

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5. Six individual cases are such poor nursery stock they can never mature.

6. Four individuals are nearly always disfigured with fungus and four are a constant source of litter.

Are these reasons not sufficient to warrant one's saying that twenty-odd most estimable property holders had best resign their woes to one, who knows what he is about? As it happened both these cases are from one town but they can be duplicated everywhere.

It is to make impossible the repetition of such work, to encourage new efforts and to stimulate popular interest along more rational lines that this bulletin has been prepared. It has been our aim, throughout the entire study to gather information of actual work, which has been completed long enough to have borne the test of time, and to secure photographs which shall illustrate these points beyond all question.

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CHAPTER II.

If, then, in accordance with the views just expressed, we are to proceed upon a plan which shall produce an effect which is to approximate the ideal street as closely as possible, we must have an iron clad standard by which every species suggested for planting along the highways or streets must be tried before selection. And here it might be noted, that there must be a different interpretation of this standard for each situation as the same rule could not possibly apply for all sites. In regulating this standard we must keep the effect of the planting at maturity constantly in mind. What might seem eminently satisfactory in young trees might prove impossible in the case of mature specimens. This question of size and shape at maturity must then regulate the selection of the species, the order of planting and the spacing in the parking, according to the width of the street. Furthermore, the available amount of care must be considered, for certain trees will produce good specimens with a lack of attention which would prove disasterous to others. If the planter will bear all these facts, and many more, in mind, and have a sufficiently high ideal of the model street, there is no reason why the ideal should not be approximated in all cases.

The Ideal Street should be marked by many fundamental characteristics. Its width should be proportionate to its use and location and never stinted; it should be supplied with adequate drainage facilities, wide parkings and good side walks. Wires of all kinds should be laid underground. One telephone company in Riverside has already cooperated in this regard with good results. In other towns, notably, Berkeley, Pasadena, San Jose, many of the poles are located in the backyards, giving a similar good result. The parkings should be planted uniformly throughout the entire length of the street unless soil conditions prevent. Furthermore, the trees should be of uniform size and shape. This is made possible only by a simultaneous planting of trees of the same age and a subsequent pruning throughout their growth which shall be necessary to maintain such uniformity. This shape should always be one which would allow free circulation of light and air. This factor is assisted by judicious spacing

CHAPTER II.

along the parkinge.

The species must be one which does not have drooping branches to interfere with the lighting of the street, either natural or artificial, or must stand constant pruning. In special cases where electric wires of any sort occur some concession must be made to them. But the question of surface wiring is a temporary one for the time should be fast coming when all such wiring will be put under ground. The details which are of concern are chiefly those of the tree and not of the telephone or lighting companies. Furthermore, the head of the tree must be neither too dense or too open; it should be erect and not drooping; and the leaves should keep in good condition until falling. The ideal street should offer a perspective as in Fig.

Again the species sslected must be relatively free from the attacks of insects and fungi. It would be impossible to find a tree which was entirely immune, but there are some trees which are more resistent than others. A case in point would be the hawthorne, which, in the Santa Clara Valley and Bay regions, is infested with scales and aphids, in the excreta of which flourishs the sooty mould fungus which annually disfigures the trees. These conditions are, of course, controllable, but the time, energy and expense entailed make it obvious that the aesthetic value of the Hawthorne does not justify such effort in order to have it on the street.

The question of shade is very important in some parts of California and not so much so in others. In spite of the mildness of the climate, we find ourselves dependent on the sun for our comfort. For this reason alone, evergreen species should be considered with considerable hesitation, especially on streets running east and west. In addition, evergreens hold the moisture and by preventing rapid evaporation bring about bad conditions on the road or highway. But of this question of deciduous versus evergreen species, more later.

Spacing often spoils a good tree. A case in point is the frequent use of Acacia melanoxylon. This is an excellent tree in many ways. Its natural mode of growth is symetrical and fairly rapid; the scale insects which attack it

rarely produce serious effects; it lives to a considerable age and throughout its existence needs but little attention to pruning; it is fairly free from litter and is indifferent to cultural conditions. Here is a tree with a desirable set of qualifications which in almost every case is planted in such a fashion that it becomes very undesirable. When planting this acacia it should be borne in mind that it is an evergreen of a green black color and of a density of growth which produces a very intense and dark shade. Moreover it is a tree which needs abundant room for development. This fact is one which is frequently overlooked since we can find many instances where it is set at intervals of some twenty five or thirty feet so that a solid hedge of trees has developed, completely shutting out the sun from the houses behind them, until about noon. Furthermore, any air that may be in circulation is effectually shut off. The solution of theproblem is easy. If one feels that Acacia melanoxylon is necessary to his happiness, buy specimens that are headed high; prune out enough branches to keep the head from being too dense and plant at least fifty feet apart, preferably alternating across the street. In the case of very wide streets, this last precaution is, of course, unnecessary.

The question of litter is no small matter in the appearance of the city. And the tree which is untidy should have no preference over less annoying trees, in the scheme of civic decoration. A case of a very common malefactor is the ever-popular umbrella tree (Melia asadarach). This tree, which is almost invariably headed too low, causes a litter in the spring at flowering time; in the autumn the leaflets drop; then the petioles, and last of all, - intermittently through the winter, - the berries and the panicles that bore them. Here we have a case of constant litter for about two-thirds of the year, which certainly outweighs the possible beauty of foliage or flower. Another instance is the grevellia where the litter from falling leaves and broken branches is quite incessant.

And last, but not least, from the practical and economical standpoint, is

the longevity of the tree. The desire for immediate effect often overthrows proper discretion. Most of the trees which will give quick results, for example, the umbrella tree, the Carolina poplar, the silver maple, Acacia pycnantha, Acacia retinoides and many more, do not give permanent or lasting results and the effort spent on them is quite wasted. Then, when they have reached maturity and fallen into decay more money and time will be required for their removal and replanting with proper species. Altogether it is more profitable to plant well in the first place than to resort to a makeshift.

Of course there are no species showing all these points but some are better than others and in certain localities some of these features may not be of much importance. But these should be points of consideration in the study of the local problem. And it is the local problem above all things which must determine the solution agreed upon.

Chapter III.

Trees found in the regions visited.

The Acacias.

Throughout the South Acacia Baileyana is planted cheifly as an ornamental tree. At the best it rarely exceeds twenty feet. It is characterized by small but elegant pinnate foliage of a fine glaucous color which contrasts well with the golden orange blooms which appear in January and the purplish red seed pods which mature later in the season.

The style of growth is such that the tree appears at its best when the lower branches are not trimmed away but lie upon the ground. The branches grow in rather a loose fashion and unless some care is given the trees will grow into unshapely specimens. Unfortunately, this tree is not long lived and often begins to show its decline when from ten to twenty years old.

Acacia armata rarely becomes large enough to be classed as even a small tree and is of so prickly a habit that it would not be desirable for street use. For shrubbery and perhaps for roadside planting in dry soil it might be used to advantage.

Acacia decurrens dealbata. This is a fine species with pinnately compound foliage and a magnificent floral display in February or thereabout. Unfortunately, unless care is given, the habit of the tree will be bad. This is a tree which must be carefully selected among the nursery specimens and cared for to induce a good trunk with erect growing limbs. As the tree stands pruning very well, it is only a matter of care and attention in the first five or six years of the tree's life.

The objection is sometimes raised that this tree is particularly liable to raise the sidewalks. This is quite true especially if it has been planted on a parking that is two feet or less in width. In has been demonstrated, however, that this tree can be root pruned in such a fashion that this can be obviated.[1]

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1. Mr. Ernest Braunton.

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In the experiments tried a young tree was root pruned every year for three years at the same time that the top was cut back. All the roots were cut off from the tap root for as great a distance as three feet from the surface with no harm to the tree. Of course when root pruning is resorted to the corresponding pruning of the top must be heavier than it would be if nothing were done to the roots. The tree treated according to this system shows but a slight decrease in size from the trees which have grown as they would.

One advantage of this tree which is rarely mentioned is that in maturity, the head becomes quite open so that the shade cast is light though entirely sufficient to all demands.

The tree is a rapid grower and forms a specimen of considerable size in a very short time. Mature individuals need a great sufficiency of room for their development and should not be crowded. From actual experience it has been found that at three years of age, trees planted thirty-six feet apart were too close. It is to be desired that fifty feet be the minimum distance and sixty or seventy-five feet is not to be thought undesirable.

Acacia decurrens mollis. This is a form quite similar to the foregoing. The chief popular differences are the more glaucous color of the foliage and the later blooming flowers. These flowers are not so showy as those of the dealbata form, as they are of a very much lighter shade of yellow. Indeed at times they appear as merely a yellowish white.

The same requirements for planting, pruning both of tops and roots, and so forth, are needful as in the case of A. decurrens dealbata.

Acacia longifolia is one of the acacias to be avoided in street work. When young it is quite similar to A. melanoxylon which is desirable, but when the mature head begins to form, which it does at an early age, the character of the tree begins to show. The trunk rarely assumes an upright position and usually twists into some horizontal shape dividing into two or three large limbs which sooner or later become so heavy that they break down from their own weight. This is very frequent as the wood is very brittle. As there are so

many better Acacias, this one may be quite ignored for street work. The one most like it is the following:-

Acacia melanoxylon (The Blackwood) is perhaps the most common of all the Acacias in the southern part of the state. It is a rapid grower and easily and cheaply raised from seed. Its blossoms are quite insignificant although the seeds and seed-pods are quite in evidence later on, and the foliage is quite a dark green and very fresh in appearance. This dark color is objectionable to many and certainly is bad when emphasized by the close planting which commonly prevails. Plantings will be made with but twenty foot spaces between trees in five year's time the trees will be almost a solid hedge. Although the citizens do not hesitate to complain both vehemently and long on account of the funereal darkness, they rarely make any move to remove the alternate trees.

Because the Blackwood will stand a maximum of abuse, it has been woefully neglected. Because a seedling eighteen inches high will make a tree of some fifteen to twenty feet, speaking conservatively, in five years' time, without any special care in planting or afterwards, is no reason why such treatment should be advocated or tolerated. Acacia melanoxylon will stand more water than any other of the acacias and hence it is best for parkings where there is grass. Too abundant water supply leads to the production of a superficial root system. Furthermore, unless there is special care taken at planting time, this tree will form a surface root system which will not support a tree of any size against heavy winds.

This Acacia grows in many ways. The prevailing type is the pyramidal one, but there is great individuality among the trees of this shape. Some trees will grow four times as rapidly as their neighbors which have had the same care. By four times as rapidly is meant, a growth in height only as the more slow growing forms usually make a better spread. It has been found necessary and practicable both at Riverside and Los Angeles to do something to make these trees more uniform. After experimenting it was found that a severe topping, as much as one-third at the age of four or five years, made the desired change.

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There are specimens in the streets of Riverside and in some parts of Los Angeles which have been treated in this fashion successfully. Those trees which were inclined to be spindly have become broader and have spread out into a good umbrageous head. Of course discretion must be used in making this cut, as some trees will not need so heavy a cut as others. In the central and northern parts of the state the irregularity of growth is not so marked and many fine specimens may be found which do not need the severe heading back.

Acacia retinodes is often found on the streets. This is the type to which the horticultural variety Acacia floribunda belongs. It has all the undesirable features of the more common A. floribunda. While it is frequently found it is to be urged that its use be discontinued and those now in place relegated to the shrubbery where they belong. That form often offered by the trade as A. floribunda is not a distinct species but a free growing form of A. retinodes. The variety is a very handsome form of acacia which is practically ever blooming. The foliage is attractive and fresh throughout the year and the new growths which appear nearly the year round bear quantities of fragrant blossoms.

Unfortunately, this acacia grows in a very bad habit for street work. The trunk is often divided quite close to the ground and seems to prefer an oblique direction of growth to an upright one. Like all other acacias, however, it is very tractable and can be trained to a good form. This means constant attention, and constant attention for any street tree makes it undesirable on account of the expense. If the tree can be given the care needed, it will make a fine species for narrow streets where a low planting is wanted. The shade cast at maturity is only fairly heavy though like most of the other species which have phyllodia it is more dense than the pinnately leaved forms.

Albizzia lopantha, sometimes known as Acacia lopantha, is another tree to be avoided. It makes a phenomenal growth and is rather attractive while young but is very short lived and the mature form is anything but desirable. It is very dirty and frequently litters the streets with the broken limbs and seeds. It is useful, however, in sea-side plantings, as it will often thrive when other

vegetation will be severely stunted.

The Madrone.

This native tree (Arbutus men.....(?) is found growing to perfection in the northwestern part of the state where, with the Douglas Fir, it is a predominant feature in the landscape. It is a very good sized tree with smooth red bark on the smaller limbs, broad shining evergreen leaves and large terminal panicles of white flowers which are followed by showy orange and orange-red berries. The tree casts a very dense shade which is quite cold in damp weather and should be used with considerable caution. It calls for a wide road, plenty of space in the parking. It needs a moist atmosphere to make its best appearance and hence is generally found in the northern part of the state in better condition than in the more arid south.

The Araucarias.

Araucaria Bidwelli, A. imbricata, and A. excelsa are all common throughout the southern part of California. There are a notable number of fine Araucaria excelsa the Norfolk Island Pine, in Santa Barbara, and farther south the species gives place to Bidwell's form. There are many excellent specimens of this far into the inland country. In most places there are but few of A. imbricata, commonly known as the Monkey Puzzle. The chief beauty of these trees lies in perfection of form. In order to attain this the tree should have room to develop the lower branches. This consideration makes them quite useless for street work, though in a few rare cases A. excelsa has actually been planted on a parking space.

These species all do well thru the central and southern parts of the state, excepting in exposed localities or where the frost is severe. The Norfolk Island Pine is most commonly found in the Bay region though there are many good specimens of the other two species. Besides these three there are other Araucarias to be found in the state, but their occurence is not general.

The Maples.

Acer macrophyllum, the native Big-leaf Maple, has been freely planted in

the parks of the southern cities but has not been tried out on the street so far as could be discovered. This form is even less common than Acer saccharinum (the Silver Maple) although it far excels it in merit. The Big-leaf Maple, which ranges from Oregon southward, grows in the canyons of the southern part of the state to some extent and has proven a fine tree in the parks. The shade is good, the foliage desirable and the tree of good shape.

In the northern and central parts of the state it is one of the best street trees although it has not been used as much as might be desired. In Berkeley there are several fine plantings, notably on Piedmont Avenue, where the trees, though young, show great beauty of development. As this tree is a native of the Coast States and is found though Southern Oregon, we find, as might be expected, good specimens throughout all of the northern counties.

Acer saccharinum, the common Silver Maple is often planted in the parkings where it is desirable because of its quick growth. Like most rapidly growing trees, however, it is not long-lived and the wood is very brittle. The foliage is attractive and the tree of good form standing severe pruning, but the light nature of the wood makes it an easy victim of the storms that come, of the fungi that thrive in the open wounds and of many insects.

Acer platanoides, the Norway Maple, was noted in but few cases and all of these were in private yards. In all cases the trees were young and very poor specimens. So far as could be learned this species has not had an extensive trial in the south but in the northern and central parts of the state the tree matures in great perfection. It is not found in the best condition in the San Joaquin Valley or in any place where there is great dry heat in the summer season for like all eastern maples it does not enjoy the dry heat of California summers.

Acer saccharum, the Hard Maple, was found in Fairmount Park at Riverside. Although these specimens were on low ground where there was sufficient water, they had a starved appearance. There is some chance that the soil was the factor which caused the trouble but this is not certain. The trees were some twenty-five feet in height but they did not look at all happy. This species is found in

good condition in the northern part of the state but is not to be recommended for street work as of all the maples, it is perhaps, the least tolerant of street condition.

Acer negundo, and its var. californica, the Box Elder, is common throughout the south both on the streets and in private yards. In nearly every case, even in situations where water and attention were limited, fine trees were being made. The foliage is an attractive light green and gives a pleasant shade. In some cases the samaras seem to be quite persistent but in many other instances they are not. The wood of this tree is somewhat brittle and hence is open to the same objections as the Silver Maple. The tree is planted in considerable quantity, nevertheless, and in most instances has proven entirely satisfactory. The specimens noted in the coast towns are quite as good as those in the interior and vice versa. It is also found in good condition throughout all of the rest of the state and in many places is one of the favorite trees.

The Maples are one of the families of fine trees which, in the south, come under the ban of the Eastern tourist. His rule in some parts of Southern California is so complete that his edict "that he did not come to see bare branches; but sunshine, verdure, and flowers", has become the goal of all planting and although a few unfortunate creatures still yearn to watch the unfolding of bud and leaf in that fashion peculiar to the deciduous tree, the vast majority of citizens plant their rows of evergreens, and in spite of the dense shade of certain winter days, persist in their protest that evergreens only are desirable. But in the other parts of the state the maple finds a welcome place, and many watch for the yellow bloom of the Norway and Big-leaf Maples, the red blooms of the Silver Maple, and the gay autumn foliage with the same delight that is felt where the trees are native or freely planted.

The Ailanthus.

The Tree of Heaven (Ailanthus glandulosa) is a tree often found in the down-town districts where there is much dust and smoke, as it is one of the trees which will stand considerable dirt in the atmosphere. Under these

good condition in the northern part of the state but is not to be recommended for street work as of all the maples, it is perhaps, the least tolerant of street condition.

Acer negundo, and its var. californicum, the Box Elder, is common throughout the south both on the streets and in private yards. In nearly every case, even in situations where water and attention were limited, fine trees were being made. The foliage is an attractive light green and gives a pleasant shade. In some cases the samaras seem to be quite persistent but in many other instances they are not. The wood of this tree is somewhat brittle and hence is open to the same objections as the Silver Maple. The tree is planted in considerable quantity, nevertheless, and in most instances has proven entirely satisfactory. The specimens noted in the coast towns are quite as good as those in the interior and vice versa. It is also found in good condition throughout all of the rest of the state and in many places is one of the favorite trees.

The Maples are one of the families of fine trees which, in the south, come under the ban of the Eastern tourist. His rule in some parts of Southern California is so complete that his edict "that he did not come to see here greenness; but sunshine, verdure, and flowers", has become the goal of all planting and although a few unfortunate creatures still yearn to watch the unfolding of bud and leaf in that fashion peculiar to the deciduous, the vast majority of citizens plant their rows of evergreens, and in spite of the dense shade of certain winter days, persist in their protest that evergreens only are desirable. But in the other parts of the state the maple finds a welcome place, and many watch for the yellow bloom of the Norway and Big-leaf Maples, the red blooms of the Silver Maple, and the gay autumn foliage with the same delight that is felt where the trees are native or freely planted.

The Ailanthus.

The Tree of Heaven (Ailanthus glandulosa) is a tree often found in the down-town districts where there is much dust and smoke, as it is one of the trees which will stand considerable dirt in the atmosphere. Under these

circumstances it has little chance to root sucker which is its most undesirable feature. Although such suckers appear in cellars and alley ways where there is apparently little chance for any favorable growth.

The tree attains considerable size and bears large compound leaves which often color highly in the autumn. The flowers are borne in large terminal panicles. The male, or staminate flowers, which are borne on separate trees from the female or pistillate flowers, have a rather sickening odor to which various discomforts are popularly attributed. The samaras of the pistillate tree are often a vivid red in the autumn and of no small beauty, though after the leaves have fallen the persistent seeds are not attractive.

The China Wood-oil Nut.

This tree (Aleurites sp.--) has been planted in a small way near the University Campus Citrus Experiment Station at Riverside and in other isolated instances about the state. There, the trees have been kept low and do not show a form suitable for street use. At first sight they suggest the mulberry with large cordate leaves of downy texture. The nuts are borne in large green fruits and have caused several severe cases of poisoning among too curious small boys.[1] The tree on the whole does not appear promising for our work.

Bauhinia forficata

Bauhinia forficata is a rare tree which will hardly ever gain a place as a street tree, on account of its tenderness. The tree as it grows in Santa Barbara is a tree which would hardly recommend itself for street work. It has peculiarly shaped leaves and very showy flowers, which attract considerable attention, but its tenderness makes it useless for street work though highly desirable for private grounds where special care can be given.

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The Birches.

Betula alba lacinata pendula, the weeping cut-leaved birch is fairly common in parks and private yards, but, in the south, is not planted as a street tree as is often done further north Wherever it has been planted it has grown fairly well and in the north it is one of the more popular trees for narrow streets or positions where a marked contrast has been desired.

This is a tree which needs care while it is young to insure a good strong leader which will carry the drooping head well out of the pedestrian's way. If this has been cared for, the tree forms a good head and makes a fine small tree for a narrow street where a light shade is desired. Unfortunately the tree is not a long-lived one and has to be replanted from time to time. The tree also is subject to diseases which at times render it untidy. In most places, however, the tree is, as yet, in good condition.

Caesalpinia . This is in reality a large shrub and not a tree in the proper sense of the word and is rarely found in the parking spaces. At best it is of somewhat straggling growth and needs frequent severe prunings to keep it in shape. The foliage is of a light nature being highly compounded and the flower clusters are very showy with brilliant yellow petals and long red-antlered stamens.

The Camphor tree.

The Camphor Tree (Cinnamonum camphora)is a great favorite through the southern part of California because of its shapely form and shining light-green leaves which keep a very fresh appeanance through the summer months. The young growing tips have a reddish pink coloring which also adds to the attractiveness of the tree. And it is by no means confined to southern California for good specimens may be found throughout the state, especially large ones being noted in Chico.

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are in equally good situations will not respond equally to the same care. It is the general opinion, however, of those who have cared for this tree that a little extra care, in the form of watering or, in extreme, cases, fertilizing, will bring about the desired uniformity of growth.

Like most of the other evergreen trees, there is some dropping of leaves throughout the year but there is not an excessive litter. The fruit is a small whitish berry, rich in oil, but very inconspicuous on the tree and not noticeable underfoot. The camphor, as a whole, seems one of the first class trees for the city street, provided, of course, there is a wide parking and a considerable amount of care for the first five years, at least.

The Beefwoods or She Oaks.

The various Casaurinas have all been used in the parking spaces but perhaps the most desirable one is the species C. stricta.

This tree has a very peculiar characteristic form which tells of its drought resisting qualities, and which, in the more mature trees, is somewhat suggestive of the habit of the pines. The trees are not of strikingly beautiful appearance and are likely to be disfigured by the dust which accumulates on them and the reddish discoloration due to the forming of the winter buds, but have considerable claim upon the attention from their oddity.

Aside from these facts, however, the tree has some peculiarities which make it invaluable in certain localities. First and foremost is its resistence to alkali. The exact per cent which can be tolerated is not at hand, but it is reported that a considerable quantity of alkali will not affect the vigor of the tree in any visible degree. And like most of the alkali-resistant plants, the tree will tolerate long periods of drought. Moreover, under favorable conditions, the tree is of fairly rapid growth and will give a light shade in a reasonable time.

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though it grows successfully in many of these situations. Where, however, there is no real necessity for a tree of such marked adaptation to arid conditions, there is little justification for its use.

The Cassias.

The most frequent Cassia (C. tomentosa)is properly a large shrub or small tree and not suitable for parking use where shade is the only object. To be sure, it is rarely found so planted, but occasionally it does occur. It is a leguminous plant with terminal panicles of showy yellow flowers which are followed by pendant legumes. Altogether it is too brittle and too short-lived to be considered as an ornamental tree of great value, though it might be used in situations calling for special treatment.

The Chestnuts.

The Chestnut (Castanea sp.--) occurs as rare specimens all through the state. So far as is known no specimens were found in the parkings in the south, but there were some magnificent trees in private yards. In rare cases it had been planted in the parking in the north but the best specimens which are not many, are to be found in plantings other than those in the street.

By natural habit the tree is usually of symmetrical shape and requires little care toward that end. The foliage is good and the flowering in these sections is inconspicuous. The trees, for the most part, do not fruit. This is a tree for which no recommendation can be made for lack of evidence. Certainly it should not be planted on narrow streets or streets with narrow parkings.

The Catalpas.

The Catalpas (principally C. speciosa) occurs scatteringly both in private yards and in the street work. At best it does not appear to be very happy in the south though isolated specimens do occur which seem to be thriving. In the north however, many good trees may be found, but so many more desirable trees may be selected for street work that it not to be considered in most instances.

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panicles of white flowers in the spring. So far as was noticed there was little maturing of fruit in the south, but doubtless this cannot be depended upon as these trees fruit freely in the north. The tree is of fairly rapid growth and reasonably free from insect pests. As to its permenant value only experiments can tell.

The Cedars.

The Mt. Atlas Cedar (Cedrus atlantica)is found less frequently than the Deodar. Perhaps this is accounted for by its less rapid growth and its less showy appearance in the first years of its life. The difference in growth, however, is slight and the full beauty of the tree at maturity should be considered. The needles are much shorter and darker as compared with those of the Deodar.

The Deodar itself (C. Deodara) is a fine tree with good foliage of a semi-glaucuous tint. The tips of the young shoots have a pendant nature which adds much to the grace of the tree.

Both of these trees are conifers and are opsn to the common objection of the pruning away of the lower branches. This has been done, however, on specimen trees with no very bad result. See Fig. This tree was pruned up to a height of some eight or ten feet. It might be trimmed even higher as the lower branches have a tendency to droop which might become objectionable at maturity.

Another remedy for this has been suggested in many cases by pruning to a shape such as is shown in Fig. This has its advantages but would occasion frequent prunings and would, in the course of time, become unsightly. It would also necessitate wider parkings, and to our mind is much more objectionable than the renewal of the lower limbs.

There is no question but that the Deodar makes a noble avenue tree. However, the problems connected with its use call for considerable ingenuity and a careful study of local conditions. The prospective planter must remember that there will come a time when the tree will have a spread at the base of

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at least forty feet and that there will be some tendency for large roots to show near the surface for some twenty feet. Moreover the shade will be very thick so that alternate planting may be advisable in some cases. Furthermore, there will be a dropping of needles which will be of considerable annoyance to any abutting property holders who have a lawn. (It might be pertinent to note at this point that English Ivy (Hedera helix)does well as a ground cover under these trees). For all these problems no hard and fast rule can be made.

This tree does not tolerate freezing or even heavy frosts but was noted in good growth from San Diego to Ukiah and Chico so that it may be planted through considerable range in this state.

The Carob Tree.

The Carob Tree or St. John's Bread Tree (Ceratonia siliqua)is found in increasing numbers throughout the south. This is a newer tree of great beauty. The foliage is of a deep and peculiarly shining green which is in no way diminished through the summer months. The tendency of the tree is to form a broad rounded top of considerable size. The foliage is evergreen, compound and the fruits are legumes, the flowers being rather inconspicuous. The number of seeds produced seems to vary greatly, some trees producing but few and others great quantities. The fleshy part of the fruit in the pod is edible but is not of sufficient note to be considered, though it is reported as good food for hogs.

For the objectionable points we must note two or three things. This tree, true to its evergreen nature, drops its leaves continually and even more freely than some of the other broad-leaved evergreens commonly found. Again, the tendency of growth is peculiar. As has been said, the type of crown is a low, broad, rounded head. This head is often formed, in fact is usually formed, in well-cared-for trees by the division of the leader into five or six almost coordinate branches. One or two of these may take the place of the leader and

divide similarly farther up, but usually there is but one division. As time goes on these branches attain great size and from their own weight and tendencies of habit assume a more or less horizontal position. While the wood is not exceptionably brittle, specimens of considerable size are often split by the weight of the branches in such a way that the shape of the tree is hopelessly ruined. See Fig.

Of course the logical solution of the problem is for some enthusiastic nurseryman to make a study of the training of these trees with the hope of securing trained specimens which will be suitable for street work. The effort to thwart natural habits is a tedious operation - the result, if successful, must demand a price which some will be loath to invest. But it is to be hoped that the time is fast coming when all the nursery stock used for streets will be first class only.

This tree, in its best development is confined almost entirely to southern California. About the Bay we find most of the trees, although still very young, are assuming a shrubby rather than a tree-like habit.

The Cypresses.

The Arizona Cypress (C. arizonica) is one for which Dr. Franceschi entertains considerable hope. Coming from the mountains of Arizona, it will stand considerable cold and drought. Like the Guadalupe Cypress it has a silvery color, though as a tree it never becomes so large or spreading a tree.

The commonest cypress is of course the Monterey Cypress (Cupressus macrocarpa). This has been planted freely and is still being largely used in spite of the fact that in the Redlands - Riverside district, its age is limited to forty or fifty years at best with a period of marked shabbiness commencing anywhere from the twentieth to the thirtieth year on. No one as yet has ascertained the cause of the injury or the remedy although there are many conjectures. This decline in vigor is to be noted to a more slight degree throughout the other parts of the state but is not so marked or so objectionable as in the south.

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The Guadalupe Cypress (C. guadalupensis), is met with frequently and often forms a finer tree than the Monterey. Popularly speaking the two are quite similar except that the Guadalupe Cypress has a striking blue color to the foliage. The glaucuous color varies somewhat but is usually of fairly deep tint. This tree does not seem to be as short-lived as the Monterey species, although many think that it will go the same way. Time will be the only test and for that we must wait.

The Italian or Oriental Cypress (C. sempervirens var. fastigiata) is often found, and often in the most absurd places. Its tall columnar form gives a formal effect which cannot be gainsaid. This very shape also makes it practically useless as a shade tree.

The problem then is simplified to the question - is there a place for so formal a tree as the Italian Cypress? No one will venture to say that such a place may not be found. Street planting at best is more or less formal through force of necessity. The placing of lights and poles for practical purposes must be mathematical and the symmetrical planting of the trees is more staisfactory than an irregular or "landscaped" planting, if such a term may be used. This is true unless, with extreme emphasis on the exception, - unless the paving of the streets and sidewalks, the construction of the lights and the type of architecture of the residences are all of such exalted type that specially designed planting is absolutely necessary. Then it is to be hoped that the planting will be entrusted to one who shall have the same intelligence and care as those who designed the residences. Landscape work on the street is a most trying form of work and calls for a sane mind and considerable native ingenuity.

Lawson's Cypress (Chamaecyparis Lawsoniana) while not a true cypress in many ways resembling them may be put here for convenience in grouping common names. This tree is a tree which is found on the parkings and even under the best of circumstances does not belong there. It produces a very dense shade and considerable litter. It will survive on poor soil and with little water but

at best looks rather untidy. On the lawn where it can have the lower limbs preserved it makes a beautiful specimen.

The Cedrelas.

This is a group of trees which have not been tried out, to our knowledge, on street parkings. They are deciduous trees with compound foliage of a showy size and smooth high trunks. Dr. Franceschii speaks favorably of Cedrela fissilis in his report for the "Pomona Journal of Economic Botany."[1]

The Loquats.

The Loquats (Eriobotrya japonica) are rarely found on the parking and while of considerable artistic merit from the point of view of the individual, they are not of sufficient size or of such a nature as to warrant their use on even a narrow street. The litter is considerable all through the year.

They appear to succeed equally well from north to south along the coast, and almost as well in the interior, in situations where freezing is not severe.

Eugenia.

Of all the Eugenias, myrtifolia is certainly the most common. This is a tree with small evergreen leaves of good character,(rather inconspicuous flowers) and pinkish berries. The foliage, however, is its chief claim to beauty, the young shoots showing a red color which contrasts well with the older leaves. The style of growth is columnar and hence, semi-formal. The tree stands pruning and trimming and can be used for most formal situations. The columnar habit suggests that it might be used on narrow streets where excessive shade is objectionable. This tree was noted in good form from San Diego as far north as Sacramento.

The Eucalypts.

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more or less known. A large number of species are utilized in roadside work in many places. Some of these species are acceptable but the general consensus of opinion is that for the city all but perhaps one or two species have no place at all upon the parkings and, in many minds, there is no doubt even for these few. The following are descriptions of some of the commonest and are given, not as recommendations, but as data gathered.

Eucalyptus amygdalina, Labill. This is a species of medium size attaining, in some cases, a good height with bark more or less deciduous, showing whitish in the younger stages. The branchlets are of somewhat drooping habit. The leaves are rather narrow but are narrowest in the variety angustifolia. The flowers are borne crowded in small umbels in the axils of the leaves and are not particularly showy. E. amygdalina var. angustifolia is probably better than the type for general use. It certainly is more delicate and graceful. Unfortunately, the tree has a somewhat straggling habit unless cared for with considerable pains in the youngest stages. This tree has been used successfully in Pasadena. It is recommended for wide streets and of these only for such as have parkings.

Eucalyptus calophylla R Br. This tree came to notice in a particularly fine specimen at Redlands. It is a tree of fair size with broad leaves and terminal corymbs of showy white flowers which give the tree a striking appearance at time of blossoming. The tree noted was in full bloom in the early part of August but this feature cannot be depended upon. This species does well in southern California while all of the specimens noted in the Bay Region were somewhat atunted.

E. citrodora, Hook. This species is commonly known as "Lemon-scented Gum" and botanically is often grouped as a variety of E. maculata. It is a tree with smooth, grayish-white bark and medium sized leaves which have a strong lemon-like odor. The flowers are white borne in axillary umbels. They are not particularly showy but are freely and markedly visited by the bees which obtain consi-

derable nectar from them. This is a species needing at least roadside planting.

E. cornuta, Labill. The Yate is a species forming a small to medium head. The largest specimen noted is at Berkeley, on the University campus. It is a tree with a spreading top, rather broad leaves, and umbels of flowers peculiar for their beak-like caps and long greenish yellow stamens. These features often attract popular notice. The var. lehmanni has even more striking flowers in this regard but at best it is but a large shrub. So far as was noted this tree did not occur in street work and so no recommendation can be offered either for or against.

E. corynocalyx, F. v. Mueller, The Sugar Gum is used rather freely in San Diego . It is found in most cases as a small tree with broad foliage and rather slender tops. In most places the practice of beheading has been carried on so that in many cases there was but a compact head of new shoots. This is hardly advantageous to the beauty of the tree but it has been necessary in order to keep the tree within bounds. The tree is fairly popular and certainly has distinctive and attractive foliage.

E. crebra, F.v. Mueller, is a form with small or medium-sized tree, rather good sized leaves and many small flowers produced freely in short panicles. This was not noted in the regular plantings and is not to be recommended.

E. erythronema, Turcz. This is one of the most ornamental of the smaller eucalypts. At present it is not very commonly found but is worthy of considerable notice. It is a small tree of not very rapid growth with medium sized dark green leaves and axillary umbels of brilliant crimson flowers. They are not as large as the flowers of E. ficifolia but are very freely produced and are quite as showy. The tree has a good, erect, pyramidal habit. It was called to our attention in San Diego where an excellent specimen was shown. This tree, perhaps, has a place on the streets.

E. ficifolia, F.v. Mueller. This is perhaps the commonest of the showy forms of Eucalyptus. The tree is one of medium size, very similar in all

general respects to E. calophylla, except in certain characteristics of seed, seed vessels and seedlings. The flowers also are nearly always of a more brilliant color, ranging from orange scarlet through crimson. This character does not always hold on first inspection as some of the forms of E. calophylla are deep red in color. It is a small tree at best and has been used successfully in the streets where the parking is of sufficient width to accomodate the roots without danger of injury to sidewalk or curb.

E. globulus, Labill. Blue Gum. This is of course the commonest Eucalypt grown in California and is too well known to need description here. For it, no place can be urged among the trees for the city. Its beauty is undeniable but its extreme size makes it unsafe at times, causes breaking of curbs and sidewalks, necessitates extremely large parking spaces at any rate, often interferes with water pipes and in every way makes it inevitable that it should be given a place on a wide boulevard in the country where its great beauty and size may be fully developed without interfering with the factors which go to make city streets desirable in every way.

E. goniocalyx, F.v M. This is a medium sized tree with large leaves of a shape somewhat similar to that of the Blue Gum leaves. The bark is rough on the trunk and somewhat deciduous on the upper limbs. The flowers are borne in axillary umbels and are not showy.

Since the leaves are rather pale in color and freely spotted it is known in some parts of Australia as the "Victorian Spotted Gum".

E. leucoxylon This species is commonly found and is often called the White Ironbark. It is a fairly tall tree, branching fairly well down the trunk with light colored bark which is deciduous. The flowers occur in axillary umbels and are quite uniformly three in number. They are white in color and not particularly striking.

This species is not one of marked individuality but is a good tree and may find a place in some highway work.

It is quite closely related to E. sideroxylon, which it resembles in most

ways except in the bark and in several less conspicuous matters. The var. rosea of the latter has pretty rose-pink flowers.

Eucalyptus melliodora, Cunn. This is another species attaining considerable size. It is popularly known as the "Honey-scented Gum." It branches freely, bearing narrow lanceolate leaves, somewhat falcate, of rather thick texture, about three or four inches long.

The flowers are small and are borne in crowded axillary umbels. They are not showy.

E. piperita Sm. This form is commonly called the "Peppermint Stringy Bark." It is a tall tree with rough persistent bark and large, thick, scented leaves, resembling in shape those of the Blue Gum. The flowers are rather small and may be borne in crowded axillary umbels. As might be easily seen, they are not showy.

E. polyanthemos Schau. This tree, commonly called the Red Box-tree, varies from a small to a large sized tree. Its bark is rough and persistent. The foliage is rather characteristic, varying from orbicular to ovate, and is of a distinctive gray-green color. The flowers are small but are pronounced in large terminal panicles, so that they are rather showy. This tree has been recommended for street work by some, but no plantations have been noted to date.

E. pulverulenta, Sims. This species is nearly always a small tree. The foliage is quite characteristic with sessile leaves varying from cordate to ovate in shape and showing a marked glaucuous or even nearly white appearance, which is quite marked. The flowers are borne, usually, in three flowered umbels. They are not very showy and the chief value of this species lies in the marked color of the foliage.

E. Risdoni, Hook. This form, sometimes called "Drooping Gum" is a small or medium sized tree with smooth bark and sessile, ovate leaves of a very characteristic form and grayish color. The flowers are small, white, and borne

in axillary umbels. They are not particularly showy. The drooping habit of the branchlets and the characteristic foliage make the tree a striking ornamental.

It has been recommended by some for street work but so far as noted has not been tried out.

E. rostrata, Schlect. This form is quite near E. tereticornis and resembles it closely in many ways, but having as a rule somewhat narrower foliage. The characteristics often given for the caps do not hold in many cases. The tree attains considerable size, thrives best in fairly moist soil, tolerating flooding from time to time and even a large per cent of salt in the soil. It is as hardy as the Blue Gum.

E. rudis, Endl. This species is a medium sized tree, branching freely. It has rough persistent bark and a marked drooping habit of the branches, which gives it a very picturesque appearance. The foliage is thick and strongly scented. The flowers are numerous but quite inconspicuous as the stamens are not showy. The leaves show considerable variation, on one tree varying from ovate to falcate. This tree would perhaps be acceptable for a wide street with very wide parkings.

E. tereticornis, Sm. This species is very similar to E. rostrata described above. Like it, it prefers a moist subsoil and will stand excess of water at times.

E. viminalis, Labill. This tree, commonly called the "Manna Gum" is a large tree of great beauty. It branches freely and often has a good spreading form. The bark varies in texture, either showing a white deciduous color, or a rough dark color. The leaves are rather narrow. The flowers are white, borne in axillary umbels almost always three flowered. This feature is one which superficially separates it from E. Stuartiana, F.v M. the "Apple Scented Gum" which it much resembles.

The following species have been reported from California. They are taken from Dr. Hall's list for the new edition of Bailey's Encyclopedia of American Horticulture.

Eucalyptus acmenioides
E. amygdalina
E. amygdalina var. angustifolia
E. amygdalina var. radiata
E. amygdalina var regnans
E. buprestium
E. calophylla
E. citriodora (syn. E. maculata var. citriodora)
E. coccifera
E. coriacea
E. cornuta
E. cornuta var Lehmanni
E. corymbosa
E. corynocalyx
E. cosmophylla
E. crebra
E. decipiens
E. diversicolor
E. doracoxylon
E. drepanophylla
E. eugenioides
E. eximia
E. ficifolia
E. globulus
E. goniocalyx
E. gunnii
E. haemastoma
E. hemiphloia
E. macrorrhynca
E. marginata
E. megacarpa
E. mellidora
E. microcorys
E. microtheca
E. obliqua
E. occidentalis
E. paniculata
E. pilularis
E. piperita
E. Planchoniana
E. platypus
E. polyanthemos
E. populifolia
E. pulverulenta
E. Ravertiana
E. redunca
E. resinifera
E. Risdonii
E. robusta
E. rostrata
E. rudis
E. saligna
E. salmonophloia
E. siderophloia
E. sideroxylon
E. sieberiana
E. stellulata

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E. amygdalina var. angustifolia
E. amygdalina var. radiata
E. amygdalina var regnans
E. buprestium
E. calophylla
E. citriodora (syn. E. maculata var. citriodora)
E. coccifera
E. coriacea
E. cornuta
E. cornuta var Lehmanni
E. corymbosa
E. corynocalyx
E. cosmophylla
E. crebra
E. decipiens
E. diversicolor
E. doracoxylon
E. drepanophylla
E. eugenioides
E. eximia
E. ficifolia
E. globulus
E. goniocalyx
E. gunnii
E. haemastoma
E. hemiphloia
E. macrorrhynca
E. marginata
E. megacarpa
E. mellidora
E. microcorys
E. microtheca
E. obliqua
E. occidentalis
E. paniculata
E. pilularis
E. piperita
E. Planchoniana
E. platypus
E. polyanthemos
E. populifolia
E. pulverulenta
E. Ravertiana
E. redunca
E. resinifera
E. Risdonii
E. robusta
E. rostrata
E. rudis
E. saligna
E. salmonophloia
E. siderophloia
E. sideroxylon
E. sieberiana
E. stellulata

E. stuartiana
E. tereticornis
E. tetraptera (shrub)
E. viminalis

Most of these are trees of varying size. But the great majority of them occur as specimens owned by people or concerns particularly interested in Eucalypts. Of course we are not in position to recommend one way or another, but it is well to keep posted with all the forms to be found in the state, since among the newer species we may find individuals which are more suited for our purposes than those which are now commonly employed.

The Ficus

Aside form the commercial figs, the commonest of these trees is probably the "Moreton Bay Fig" (Ficus macrophylla). This makes a magnificent tree with its smooth gray trunk and large, shining, dark-green leaves. It is a broad leaved evergreen, with leaves resembling the common "Rubber plant" (Ficus elastica) of tho nurserymen. The tree has fruit resembling a small fig which never become soft as do the edible figs. These fruits and the leaves make a considerable litter at all times, - this is especially true of the leaves. In nearly all the specimens noted, the appearance of roots near the surface of the ground was very considerable. To be definite, a twenty-foot parking would be the minimum parking and it none too wide. It has been suggested by one who has practiced root pruning on other trees, that root pruning may be the solution of this problem.

In planting it should be borne in mind, that this tree is disfigured by heavy winds, and that as tho tree attains great size and produces a very dense shade they should be planted at least eighty feet apart and used only on streets of suitable width.

Dr. Franceschii recommends F. retusa, F. rubiginosa, and F. bellingeri. The first one has been tried out, the two latter have not. Like the Moreton Bay Fig, these are all large trees and suited only to wide avenues.

The Arizona Ash.

This ash (Fraxinus velutinus)is the one found frequently in the south and is deservedly popular when one considers what it will attain under adverse conditions.

The tree itself resembles the other ashes, with large compound leaves, inconspicuous blossoms, and large panicles of green samaras in the fall. In Los Angeles, the foliage was a good dark-green but in San Bernardino, where the tree is largely planted, the foliage assumes a gray-green color. The shade, while rather light, is entirely sufficient. The tree is , of course, deciduous.

Other species of ash are to be noted especially farther north, where the Oregon Ash (Fraxinus oregona)is often found. This forms a good tree which is worthy of attention for sake of variety. Fraxinus ornus is also found in rare cases. This does not become so large a tree and is not so desirable for our purposes.

The Ginkgo Tree.

This tree (Ginkgo biloba)has been the subject of considerable comment. It is a tree of unique appearance having a very characteristic style of branching and a wealth of fine foliage. The foliage resembles a single one of the pinnae of the maiden hair fern on a large scale, hence the name "Maiden Hair Tree" is sometimes used.

As the species is deciduous, pistillate flowers do not occur on every tree which is fortunate as the mature fruits have an unpleasant odor when crushed. Other than this there are no great objections to be offered. The species is deciduous.

Care should be taken to stake the plants well during the first years as the wood is somewhat brittle in those stages, but not noticeably so afterwards.

So far, all the specimens noted in Southern California are rather young and most of them were in parks or lawns. Those few on the streets seemed to be thriving as did those in the parks. Further experience must be had before this tree

can be recommended for general planting. At present, in some places, it certainly looks promising. Farther north, there are many older specimens and as the tree is quite hardy it may be that it will be even more useful in the north than in the south.

The Silk Oak or Grevillea.

The Silk Oak (Grevillea robusta) is common throughout all the South and everywhere is proving a common source of trouble. When young, the trees have considerable beauty of form and foliage and the blossoming of the mature trees is most gorgeous. But unfortunately, the leaves are continuous and abundant in dropping and the wood is so brittle that the tree should be cut back to stubs every year for safety's sake. This proceeding inevitably ruins the specimen. Furthermore, the roots have great capacity for entering the water-pipes and once in, they form dense sponge-like masses of fibrous rootlets.

Altogether, the Grevillea, while a handsome tree, demands too much care to keep it in respectable conditions, to earn a permanent place for itself on the streets. Many towns are removing it from the streets and it is to be hoped that the citizens who raise a considerable commotion "at the wholesale destruction" will stop to think that the Grevillea has habits which make it useful only in private estates where it can have constant care and dense shrubbery to hide the continuous litter of the falling leaves.

This tree is reasonably hardy and may be found in good condition through the northern central part of the state. But it is not so good there as in the south.

The Kentucky Coffee Tree.

This is a common eastern deciduous tree (Gymnocladus dioica)with large compound leaves and panicles of greenish-white flowers followed by bulky fruits, the seeds of which have rarely been used as a substitute for coffee.

The Walnuts.

The Walnuts (*Juglans sp.*) of various species and horticultural kinds are all frequently found in the parkings. Often they are the remnant of some old orchard but more frequently they are the deliberate choice of the owner who desires to derive not only shade but profit from his trees. If we consider the sprawling form of young walnuts which have the frequent waterings of the parking and the fact that they attain great size, and furthermore, that they, or their insect visitors exude a gummy substance which makes the pavement very unsightly for at least two months of the year, - if we consider these things, we can see that the walnut is certainly not desirable for narrow streets and if useful at all, is best suited to broad highways on the edge of town. Here it may develop to its greatest perfection and will not interfere in any way. Many of the native walnuts appear as magnificent specimens, which deserve great admiration. But an immense specimen may not always look well when it is put in the artificial conditions of the parking.

The Jacaranda.

The Jacaranda (*Jacaranda mimisaefolia*)is an ornamental tree attaining perfection only in the coast cities of the south, where the frost is not severe. It bears large and delicate pinnate leaves and good sized panicles of showy purple flowers in July and August. The growth of the plant is inclined to be somewhat straggling and an occasional corrective pruning may be necessary. Too heavy or too frequent pruning will have the same effect as heavy frosts, namely of removing the new wood which will produce the flowers for the following season.

Owing to its small size, this tree is suitable only for narrow streets or for alternation with more rank growing species, which will provide sufficient shade. As it has a tendency to form many leaders quite early in life, nursery stock should be selected with care and watched that the frost or other agencies do not kill the leader before it has reached a sufficient height.

The Ironwood.

This tree (Lyonothamnus floribundus var asplenifolius) is a native of Southern California in limited areas along the southern coast islands. It is an evergreen species with large fernlike leaves of a shining dark green color and showy clusters of flowers. The tree is not very spreading by nature but produces a good head of foliage. It is of fairly rapid growth and of considerable interest as it is a native.

The litter from the foliage is not excessive but the real difficulty would lie in obtaining a sufficient stock as it is both rare and expensive. Time and demand, however, will probably change this latter feature.

As to its use on the street, no results can be offered. Certainly it would prove hardy enough but possibly other characteristics not now looked for would develop. It is, at any rate, a tree worthy of some consideration.

The Crepe Myrtle.

This species (Lagerstroemia indica) is not in reality anything more than a small tree and owing to its slow growth it must be considered chiefly as a large shrub. As it does excellently in the interior and makes a very fine showing there, it is often found in the parking spaces

The bush has small refined evergreen foliage and bears large terminal panicles of showy flowers which vary in color from white to pink, to dark pinkish crimson.

It has been successfully trained in tree form but this is tedious work and hence expensive so that it would probably be out of the question. As it is, the tree is certainly useful for wide parkings between other trees or for such streets where a dense shade is not desired. This shrub is hardy and is useful not only in the south but as far north as one might think of using it in this state.

Lagunaria.

Lagunaria patersonii is an exotic tree bearing dark green leaves resembling somewhat those of the camèllia both in texture, shape and color. The flowers, however, look more like the mallow blooms and unfortunately are of a rather dull

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Leptospermum.

Leptospermum petersonii is an exotic tree bearing dark green leaves resembling somewhat those of the camellia both in texture, shape and color. The flowers, however, look more like the mallow blooms and unfortunately are of a rather dull

purplish pink with very prominent and ugly calyces which are persistent to such a degree that they often disfigure the entire tree. This tree also appears to catch and hold all the dust from the streets and roads giving it a very untidy appearance. In style of growth it is rather to columnar for every use and from its general characteristics it is rather more suitable for parks and plantings in private yards than for street purposes.

In the north it has the additional bad feature of shedding about one-half of its leaves during the winter, as it is neither deciduous nor strictly evergreen.

The Laurel.

The laurel (Laurus pseudo-cerasus) is rarely found on the parkings and wisely, as the foliage is of a very dark green color and gives a heavy shade. As far as appearance goes the tree has everything to recommend it for use in parks, but not in the street parkings.

One thing should be remembered, and that is, that this species is a good harbor for many scale insects. It is true that many of them are not those of first importance on the citrus fruits but it is possible that a free planting of this species might change the proportion of occurrence or might make a new host but for the most destructive forms.

The pepper tree is in many cases proving too expensive to warrant further planting on account of its harboring the black scale and with example before us, it would hardly be wise to proceed to plant a possible subject for the repetition of such trouble.

The Incense Cedar.

This native tree (Libocedrus decurrens) is one frequently met with in isolated cases. In some instances the specimens are of exceptional beauty, with abundant semi-drooping evergreen foliage and branches and with the aromatic odor of the cedars. When the tree has not sufficient moisture the tips of the branches are apt to drop out and give the tree a very ragged appearance.

The style of growth is columnar and the tree is not remarkably disfigured by the removal of the lower branches as is the case for so many conifers. In many ways the tree resembles the Lawson Cypress except that the pendant character of the tips of the branches is a distinctive characteristic.

The shade is dense and as the tree is not a very rapid grower it can not be recommended for every situation. This question had best be decided upon the ground. As the tree is very hardy and withstands considerable drought when once established, it may be used through a large range of territory from the north to the south, throughout the state.

The Japanese Privet.

This privet (Ligistrum lucidum) is the one chiefly found. At best, it is but a small tree. The foliage is evergreen; the leaves are large, oval, and of a dark green color, which is often disfigured as the leaves seem to hold the dust very badly. This fact, and the fact that the large panicles of greenish white flowers turn a dingy reddish-brown on fading, gives the plant a very untidy appearance at certain seasons of the year. The flowers have a sickly sweet fragrance which is not strong but which proves very unpleasant to many people, and are followed later in the summer by dark blue berries which are not unsightly.

If this tree is used, care should be taken in selecting nursery stock, which has an unbranched leader for at least seven or eight feet as the head is formed very low after branching begins. Constant care should be given to prevent the growth of suckers as these develop with amazing rapidity and soon spoil the shape of the tree. On account of its shape this tree needs a wide perking and should not be planted where heavy shade is desired, as the tree is not of particularly rapid growth when kept to a single leader, although it eventually forms a tree of some size, which at maturity will give abundant shade.

The Sweet Gum.

The Sweet Gum (Liquidamber styraciflua) is a native of the eastern states and is not often found in this state. So far as was noted there were no large speci-

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The Sweet Gum.

The Sweet Gum (Liquidambar styraciflua) a native of the eastern states is not often found in this state. So far as was noted there was no large speci-

mens to be found. All of the young trees seemed to be vigorous and in good form, and it would be well to keep this species in mind for future work. The specimens particularly in mind were at Monrovia, others at San Jose, Oakland, Berkeley, Ukiah and Chico.

The tree is a deciduous tree of very good habit bearing five-lobed leaves of a somewhat star-like form, of a good green color, which in the east takes on splendid autumn tints. This point has not been noted for California. The fruits are contained in a peculiar warty, ball-shaped structure which hangs pendant after the fashion of the Sycamore fruits. These fruits are abundant but are not of particular trouble from point of view of litter.

The Tulip Poplar.

The Tulip Poplar or Tulip Tree (Liriodendron tulipifera) is not commonly found in the southern part of the state although it does well from San Jose northward. It is a deciduous eastern tree with curiously shaped foliage which resembles no other foliage. The flowers are not very conspicuous though of considerable beauty. They are tulip-shaped, of a greenish yellow color with an orange flame in the center of each petal. The stamens and carpels are rather conspicuous and at the time of the falling of the winged achenes attract some attention.

Those trees noted in San Jose had attained considerable size before fruiting and did not seem to flower so freely as those in the east.

This tree, as has been said, has not been tried for street use in southern California. We are not recommending it. It is to be hoped some one will risk his reputation among his fellows and try it to settle the matter finally. Belonging, as it does, to the Magnolia family, it is characterized by its fleshy roots and rootlets. These are indicative of its water-loving habits. In some parts of the east it is native and grows well upon heavy clay soils of no great fertility, so that there may be some latitude on these points. If some situation can be found where there is soil of fair fertility and reasonable water supply, it might be worth a trial.

The tree is not a tree of rapid growth here but at maturity attains great size, hence it should not be used on narrow streets. The habit of growth is good but care should be taken to keep the leader unbranched for ten or twelve feet. Branching below this point ruins the shape of the tree. It has been noted in some localities that the wood is brittle; whether this is true for California or not remains to be demonstrated. With this in mind it would hardly be well to plant the tree where it would be subject to heavy winds.

The Magnolia.

The Magnolia most commonly found is Magnolia grandiflora. This tree is too well known to necessitate more than a mere mention of its large shining green leaves and handsome white flowers which are highly fragrant.

This tree assumes a natural pyramidal shape and at maturity attains such size that is suitable only for wide streets even though for many years, owing to its medium slow growth, it may appear to be inadequate. Planters considering this species should remember that the litter is considerable and continuous. Furthermore, the shade is of a very black, dense quality. As to situations, care must be taken to see that the tree has an abundance of water as it is a water loving species, and if stinted in water supply assumes a poor light green color of foliage with a noticeable lessening of vigor and length of life.

Certainly for most city streets it would not be desirable but for wide boulevards where the soil moisture is plentiful or artificial watering is easily available, it might be useful.

There are many other magnolias worthy of consideration, especially in the northern part of the state. Some of these are deciduous species of considerable individuality. In Japan there are many fine avenues of magnolias and we may gain some inspiration from their use in that country.

The Umbrella Tree.

This tree (Melia azederach and var. umbraculiformis) is one of the most common trees found. This is perhaps due to its very rapid growth and hence

quickness in giving adequate shade. Where it is well grown it forms very handsome specimens. But in ninety-nine cases out of a hundred it is not well known, with the result that branching begins too low down; too many branches are formed; and large portions are broken out by any chance wind. This light nature of the wood makes it an easy prey to fungus troubles so that after pruning or a splitting of the trunk, decay is often brought about even in cases where care is taken.

Of course under proper nursery treatment the heading can be brought to a reasonable height and the number of branches properly restrained. But even if these points were removed the excessive litter would give the tree a low place in the scale of species. The large compound leaves first drop their leaflets and then the rachis and petiole by degrees. Fruits also are very abundant, and, as the flesh of the berry is very slippery underfoot, it is often unsafe. Some serious accidents have been attributed to the fruits. It has been noted in some parts of the south, Redlands particularly, that certain specimens of the var. umbraculiformis bears less fruit than the more spreading type. This variety is the more common form as the other tree is less desirable even in popular estimation though it does escape the notice of many, in the younger stages.

Although this tree has undue popularity for a deciduous species, it cannot be recommended for permanent plantings. And although isolated specimens may be found in many places where they appear to advantage, it is the concensus of opinion that as a street tree it is not to be considered in the future.

The Mulberries.

The Black Mulberry (Morus rubra) and the White Mulberry (Morus albs) are occasionally found in the parking spaces. But their style of growth, abundant fruit and irregularity of life make them unsuitable for plantings of any sort upon the street. Possibly they might be used in the country along the roads, but even then they would hardly warrant the expense of a permanent planting.

The Banana.

Various species of Banana (Musa) are found through the south but rarely on the parking. Owing to the fragility of the leaves they should not be used, except in places free from winds. Even then it would be questionable if any reasonable decorative value would excuse their use. At any rate, shade would be secondary in importance.

The Oleander.

The Oleander (Nerium oleander) in all of its many horticultural varieties is often found upon the parking. Strange to say, in no case noted had there been any effort to keep the stem to a single leader. With what result? Everywhere, except where it was planted in the shrubbery, there was a large straggling bush often covering the sidewalk and at such a height that it would strike all passersby.

Here again is a case where careful nursery practice is of prime importance should this tree be used at all, and it is quite possible to conceive of its use in narrow streets, with wide parkings where shade is a secondary matter. It would be well in such plantings to choose only one or two varieties as too great a contrast of colors gives a messy appearance.

This has been used with considerable success as a shrub, to alternate with the Canary Island Date Palm. As both of these species need wide parkings the oleander can be allowed to grow in its busy form without disturbing pedestrians.

The Olive.

The Olive (Olea europea) as it is now found in the parkings is in most cases a remnant of some old orchard. It is planted by choice, however, in some instances. This practice is one which can hardly be recommended.

If the tree be considered as a unit it has many desirable features. The style of growth is distinctive, especially the gnarled buttress; and the color of the foliage also adds a pleasing note of contrast.

The shape is one which makes it practically impossible to head it up to such

The Banana.

Various species of Banana (Musa) are found through the south but rarely on the parking. Owing to the fragility of the leaves they should not be used, except in places free from winds. Even then it would be questionable if any reasonable decorative value would excuse their use. At any rate, shade would be secondary in importance.

The Oleander.

The Oleander (Nerium oleander) in all of its many horticultural varieties is often found upon the parking. Strange to say, in no case noted had there been any effort to keep the stem to a single leader. With what result! Everywhere, except where it was planted in the shrubbery, there was a large straggling bush often covering the sidewalk and at such a height that it would strike all passersby.

Here again is a case where careful nursery practice is of prime importance should this tree be used at all, and it is quite possible to conceive of its use in narrow streets, with wide parkings where shade is a secondary matter. It would be well in such plantings to choose only one or two varieties as too great a contrast of colors gives a messy appearance.

This has been used with considerable success as a shrub, to alternate with the Canary Island Date Palm. As both of these species need wide parkings the oleander can be allowed to grow in its bushy form without disturbing pedestrians.

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The shape is one which makes it practically impossible to head it up so as

a point that it will give any shade. This same style of growth necessitates a large parking space. But more important than either of these objections is the fact that the tree is a favorite host plant of the Black and other scales. This fact would make it undesirable in all citrus growing districts as the expense of spraying or fumigating shade trees is an expense which cannot be termed as strictly necessary.

The Parkinsonia.

This tree (Parkinsonia aculeata) is in reality a small tree or large shrub, and so far as noted did not occur on the parkings. The leaves are very delicately compounded with very small leaflets. The style of growth is very irregular; flowers yellow, showy. It is of some interest as it is a native but is more desirable as a shrub than as a tree.

The Pines.

The Pines are often found on the streets but the popular practice now is to use them only for roadside plantings. Here they are often useful.

Pinus canariensis, the Blue Pine, is a tree attaining a considerable size, is of rapid growth and stands some drought. It is characterized by long drooping needles of a glaucous color. Stump sprouts.

The tree has slender branches and forms, at maturity, a broad round-topped head; though in its youth it has the pyramidal form characteristic of conifers.

Pinus halepensis, the Jerusalem or Allepo Pine is a form with short needles of a somewhat grayish color; of slender habit, with an open head; the younger branches often assuming a peculiar twisted appearance. So far as could be discovered, there were no very old specimens to show mature form.

This is a species of no striking beauty but lays claim to usefulness from its great indifference to drought and considerable amounts of alkali. For this reason it has a usefulness which will discount whatever it may lack in aesthetic value, although it is not a poor looking specimen.

Pinus radiata the Monterey Pine, is gradually being discarded in most parts

of the south, on account of the fact that it is subject to an obscure disease, presumably fungoid in its nature, which attacks the tree when it has attained considerable size with disasterous results. So far, no remedy has been noted.

Other than this the tree has much to recommend it. It is of rapid growth, attractive color, though some people consider it rather dark, and fairly long duration.

Pinus pinea is a tree with shining green needles whcih are quite long and slender branchlets. At maturity it forms a broad flat-topped crown with horizontal branches characteristic of meny pines. This form has considerable pictoral value as the even umbrella like shape is quite distinctive. It is commonly called the "Stone Pine". It is not hardy in regions where there are heavy frosts, but excellent specimens are to be seen in Capitol Park at Sacramento.

Pinis strobus, the white pine of the east is found occasionally in private yards. While a handsome tree with considerable individuality it is not a tree which can be reccomended as there is no data concerning it on hand.

The Pittosporums.

The Pittosporums are shrubby plants which in time attain the proportions of trees. This latter state can be hurried by care in the nursery. They are not excessively rapid growers and as they do not give a heavy shade, although they are evergreen, they are useful for some narrow streets. They are of somewhat stiff habit so that they give rather formal effects and are not spreading so that the shade is not particularly conspicuous.

Pittosporum crassifolium is found as a small sized tree in many parts of the state. The leaves are medium sized of a dark green color and covered with fine silvery hairs on the lower surface. The flowers, which appear in the early spring, often excite considerable comment on account of their dark reddish-brown color. They are followed in the late summer by inconspicuous fruits which burst open showing the seeds. This species is rather slow growing and requires considerable time to attain the dimensions of a tree. It should therefore be sparingly used for street work.

Of them Pittosporum eugenoides is perhaps one of the ones most commonly found. It is most often used for hedges but with proper care and sufficient length of time to mature it forms a good small tree with very bright colored foliage for an evergreen. The green is a distinct yellow green and forms a strong contrast to other trees. The leaves are oval to oblong in shape often with undulate margins; the flowers come in clusters and are not conspicuous, being of a yellowish green color; these are followed by small green berries. The tree forms a rounded crown of considerable beauty.

Pittosporum rhombifolium. This species is not common in California but is worthy of consideration. At best it is a medium-sized tree with fairsized smooth green leaves. Flowers are inconspicuous and are followed by yellow berry-like capsules. This tree is more tree like and erect in habit than some of the other species.

Pittosporum tenuifolium. This species is somewhat like P. eugenoides but is characterized by smaller leaves and very shining black stems. It is of rather slow growth and needs special training to induce a good tree-like form. It is in some ways more delicate and graceful in appearance than P. eugenoides.

Pittosporum undulatum. This form is usually found as a plant in high hedges or windbreaks. It has rather larger leaves than any of the preceeding and they are of a thick texture and darker color. The flowers are in terminal clusters, whitish, and are followed by showy dull yellow berries. Where it has developed into a tree it forms an excellent broad spreading crown but not a great height of trunk.

The Sycamores or Plane Trees.

Of the two species of Plane trees, the Oriental Plane is considerably the better form. This has proven the most desirable deciduous species in many parts of the city of Los Angeles.

The foliage is large, of a good green, and drops fairly late in the season. The fruits are often persistent through the winter and break up before falling

so that the litter is not especially noticeable. The bark of the upper branches scales off leaving a shining white trunk which is characteristic of the genus.

The botanical differences between the Oriental Plane (Platanus orientalis) and the native variety (Planatus occidentalis) are not striking from the popular point of view, but it has been found that the native form is freely attacked by a fungous disease which disfigures the trees all summer and often prevents foliation, producing death to many limbs.

Aside from this the oriental form assumes a more symmetrical habit of growth. The trees at maturity are broad spreading trees of semi-pyramidal shape, while the native form is often very irregular. Both species need considerable water as they inhabit bottom lands and creek borders in their native haunts. In spite of this they do very well in the city with ordinary care and in some cities, notably Paris, have become one of the dominant trees of the city.

The Poplars.

The Poplars, for street trees, are, at best, makeshifts. They are rapid growing trees, reaching maturity quickly and showing rapid signs of decline. They sucker freely and obnoxiously, fill all the neighboring top-soil with fine roots which quickly impoverish the soil.

The Silver Poplar (Populus alba) is a tree of considerable beauty with whitish bark and tremulous leaves with conspicuous white lower surfaces to the shining dark green leaves. Like the other poplars it is short-lived, has brittle wood and suckers badly.

The Carolina Poplar (Populus deltoides) resembles the Lombardy poplar in many ways but has more slender twigs and a more spreading habit of growth.

Fremont's poplar (Populus Fremontii) is a native species somewhat like the silver poplar in color, but differing from it in that it becomes a much larger tree. It is especially desirable in the interior valleys as it thrives there under adverse conditions.

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The Lombardy Poplar (P. nigra var. italica) is too well known to need a detailed description. Its peculiar pyramidal style of growth has undeniable charm when well used in roadside and other plantings but the tree has so many bad family characteristics that it is questionable if its use is advantageous on the streets. It seems probable that it would do better in private plantings where it could receive the constant attention which is necessary for its well being.

The Flowering Plum and the Catalina Cherries.

The Catalina Cherries (Prunus ilicifolia and Prunus integrefolia) are quite different as to the style of growth and the shape of the leaf. Otherwise they are quite similar; so similar that there is doubt in many minds that they are distinct species.

They are native plants with shining evergreen leaves, producing a foliage often used for decorative purposes. The blossoms are inconspicuous, of a greenish white color, and are followed by small fruits of a dull purplish red color. Some seasons these are very abundant and other seasons seem scarce. In times of great abundance they are somewhat of a nuisance underfoot. The Catalina Cherry (Prunus integrifolia) is themore vigorous form with large leaves and somewhat more rapid growth. (Note Fig.)

Mature specimens have a good form somewhat pyramidal and attain a moderate size. The shade is of such a density that the trees should not be planted too closely together.

P. ilicifolia is often called "California Holly."

Prunus Pissardii is sometimes found on the parkings. This is a small tree of considerable beauty at flowering time with its myriads of pinkish white flowers, reddish twigs and budding reddish leaves. Unfortunately, however, the mature foliage retains its purple color and hence is not suited for so conspicuous a planting. The tree is not of great longevity and hence cannot be considered permanent and if the leaves were of a green color, it might find considerable

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use on narrow streets where a maximum of sunlight was desired.

The Oaks.

The use of the oaks for street planting is one of the indications that popular attention is turning to the matter of street planting. A few years ago most people would have been inpatient at the thought of using oaks for shade trees. Now it has been demonstrated that someoaks make as rapid growth as many species of trees commonly used. Of course there is a variation among the different species of oak; and, similarly, it must be admitted that they are not suitable for plantings where quick results are wanted, but, in spite of this, their permanence and charm of individuality recommend them to the planter who is seeking an expression which shall be most perfect in its way. The characteristic live oak which is found throughout the state would not, at first thought, seem a suitable species for street use.

This oak,(Quercus agrifolia) has been used, however, rather extensively in Hollywood and Garvanza and the young trees give great promise. One thing appears in their development, and that is great irregularity in rate of growth and in many cases a tendency to bad form. The gnarled top-heavy branches which are so admirable in private yards are hardly suitable for street use. This question of irregularity is one which must be dealt with in a most thoughtful way. To confine the trees to a rigid form would remove all individuality and yet the individuality must be kept within bounds.

A very wide parking is the first thing to be obtained and constant attention to the shaping is the next item. The irregularity in the rate of growth can be regulated to a reasonable degree by attention to the watering with extra waterings for backward trees, and even a mulch of street sweepings or rich manure in extreme cases. For those trees which show a leader inclined to grow in an oblique or horizontal position, the old practice of tying the limb to an upright pole is the best method. Any suckers or shoots from the butt should be cut off promptly as if encouraged or let alone the tree will show a tendency to assume a scrubby bush like form so that considerable effort will be required to bring it back to

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good shape.

Quercus californica, often called "Kellogg's Oak" is another native species which is commonly found through certain parts of the northwest. It is a deciduous species of marked beauty. At present the nursery supply of this species would be very limited in most regions. Now that native species are receiving the attention which they deserve this matter will have to be remedied.

The Valley Oak (Quercus lobata) is another native species worthy of a place. In many places it is badly infested by certain gall-producing insects, and by growths of various mosses, which render the tree unsightly. In those parts of the state where it is one of the dominant features of the landscape its use is to be recommended.

The Tanbark Oak (Paesnia densifolia) which is not a true oak though closely related, is a tree which is a dominating species in certain regions. As it is of considerable beauty it too might find a welcome place in certain parts of the state.

A few young specimens of the Pin Oak, common in the eastern states, were noted in Los Angeles. This species is Quercus palustris. They were very young trees but were in very good form except that the leaders needed straightening Perhaps this is a tree which would warrant further experimentation and, if satisfactory, would lead to the trial of other deciduous oaks from the Eastern States.

A very good specimen of the English Oak (Quercus pedunculata) was noted in Santa Barbara. Perhaps there are others of this species through the south. Investigation of its occurrence might lead to its use.

The Cork Oak (Quercus suber) is a fine tree resembling from a popular view point the Live Oak as to foliage, except that the foliage is more contracted giving a convex shape to the leaf. The most curious point, however, is the growth of cork in the bark so that the trunk is covered with large fold-like excreesences.

This tree needs rather more water than the live oak and when this demand can be satisfied it will make a growth that will satisfy many, even those prejudiced against the oaks for street work.

The Interior Live Oak (Quercus wislizeni) corresponds very closely in most characteristics to the Coast Live Oak (Q. agrifolia). It is better for use in the interior valleys as it can stand the extremes of heat more easily than the coastal species.

The Locusts.

The common Black Locust (Robinia pseudacacia) is of course the species most in evidence. This is a tree which certainly deserves a place but it should be kept in its place. The great objection to it is its habit of suckering. This propensity seems to vary greatly as there are often noted blocks where there are no suckers and other trees under apparently the same condition which are suckering more or less freely. Often where mutilation has come to the butt of the tree or to large roots just below the surface, many suckers will arise but often there would seem no excuse for their appearance. Again on very dry gravelly soil they seem to be more abundant, but not always.

This ability to grow and do well in poor and especially in gravelly soil is one of the strong points in favor of the locust. In circumstances which would stunt any other species the locust can be found many times in a flourishing condition. It also endures considerable heat and drought.

It is a deciduous tree often assuming at maturity, the vase-like form characteristic of the White Elm. The leaves are compound and the flowers, which are white, fragrant and pea-shaped, are borne in drooping panicles appearing in the spring, shortly after the leaves.

There is a form (Robinia pseudacacia rosea) which has flowers of a delicate pink tint. This is perhaps a trifle less vigorous than the type. It can be found planted in the parkings in many places in San Jose.

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A species, Robinia hispida, has been very highly recommended and has been

noted in a few instances. Here the style of growth is quite different, being dwarfer and giving a low rounded head.

The Willows.

Of all the Willows, the old Weeping Willow (Salix Babylonica)is perhaps the most frequent in use. Owing to the brittle nature of the wood it is hardly suitable. Again, trees of weeping habit, like those of colored or variegated foliage are rather the exception in the vegetable kingdom and their use on streets would be a violation of general principles.

The Pepper-Tree.

The Pepper Tree (Schinus molle) is perhaps the most common exotic tree found in Southern California. Everywhere one turns, there is the omnipresent bright green foliage of the pepper. Nevertheless, the Pepper is beginning to fall into disrepute. For one thing, it is a particularly acceptable host for the Black scale. To be sure, if the trees are cut back past all the green wood and the trimmings burned, all the scale insects are destroyed for a time but this means endless work. Fumigation is practically impossible and spraying is not sufficently effective to warrant even, its consideration.

Again, at Riverside, and other towns where the Pepper is freely planted, they are finding that the tree needs constant trimming. The young branches are pendant, often for five feet or more. This of course makes the tree a nuisance to pedestrians. Furthermore, if the tree is cut back to stub, although it reclothes itself very promptly, there is usually precipitated a hubbub of indiscriminate popular criticism and it is quite true that the trees are temporarily ruined in appearance.

Anyone considering the use of the Pepper should remember this:

1. The pendant habit of young growth means continued pruning.
2. The Black Scale infests it.
3. It needs very wide parkings on account of the irregularity of the trunk and the breaking of pavements.

4. It requires extra care when young with staking and pruning to encourage a good form.

None of these matters are insurmountable difficulties, but they are matters entailing considerable labor and expense and should not be overlooked.

The Big Trees.

The Sequoia (Sequoia Gigantea) is commonly found through the south but rarely on the parking. It would need, of course, a wide parking, and a great length of time to mature. While most of the specimens were of reasonable size and looked fairly happy, probably none would appear so well under street conditions.

The Redwood (Sequoia sempervirens) is found quite freely on the parkings, though in no cases were trees on the parkings of any great age or size. The habit of the Redwood while young is at best rather straggling and even at maturity it is often far from symmetrical. Furthermore it is a tree which one considers as a tree to be planted in masses or groups rather than in formal lines. The planting of adjacent property could of course make this matter less noticeable. The Redwood does better nearer the coast than the other species of Sequoia.

The Redwood alternated with the Magnolia has been planted along one of the highways in Los Angeles county and considerable interest is felt in the outcome.

The Sterculias.

The Sterculias are found in considerable number throughout the State. They are trees suggesting somewhat in style and color of foliage, the camphor. The trees grow quite differently, however, the shape assumed by the sterculia is usually quite inferior to that of the camphor. The trunk is quite smooth and swells largely at the butt giving a peculiar pyramidal shape. The branches grow awayfrom the leader at large angles and after attaining considerable size, the heavy pendant seed pods at the tips pull them over to very bad positions. These pods are of considerable size and drop throughout the year, the flowers appear throughout the spring and summer and in Sterculia diversifolia are not

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particularly striking or conspicuous.

S. diversifolia has lanceolate ovoid foliage with leaves which may show one, three or five lobes or mixture on one tree.

S. ovalifolia has somewhat smaller foliage and it is not lobed.

The Tamarick.

The Tamarick (Tamarix sp.) is rarely more than a large shrub and the stems are of such awkward shapes and tendencies that it is difficult to train them to a single leader. The foliage is a light green mass, the leaves being inconspicuous and the branches showing a similar green color. In the spring or fall, according to the species, the plant is covered with small, but multitudinous flowers which are faintly fragrant. This genus has no place in the ordinary city work save in shrubbery masses but is very useful near the seashore where other shubbery does not thrive as these species do well in the sandy soils and near the ocean. It has also been noted in thriving condition in situations where it had to withstand considerable drought.

The Bald Cypresses.

These trees are trees of particular beauty and always attract considerable attention wherever they are used. They are coniferous trees and are striking in that they are deciduous and not evergreen, as would be expected. The leaves resemble somewhat those of the redwood but are of a shining light green color which is very distinctive and attractive. They have not been used extensively in this state but those specimens which were noted are excellent ones. The common Bald Cypress is a native of the swampy regions of the south eastern United States. As would be suspected from this, these are water-loving species, but they do not need the excess of moisture afforded in swampy conditions, and thrive excellently where there is any reasonable water supply.

The Montezuma Cypress (Taxodium mucronatum) was noted in many places, especially in Santa Barbara. Here the trees were not of great size and had been planted in the park where the lower branches lay on the ground. In spite of the

fact that these trees have never been noted on the parking spaces, they are of such distinctive color and form and of such striking individuality that they seem to tempt a trial on the street. This is not a recommendation, but a plea that some one will be a pioneer and settle the matter.

The common Bald Cypress (T. distichium) was not noted but is quite similar to the above except that the foliage, a trifle larger than that of the proceeding. There are splendid specimens of this tree at Berkeley.

Thuya sp.

Various species of Arbor vitae are to be found throughout the state. Some of these are native but most of them are introduced species. They are trees resembling, in general characteristics, the Incense Cedar and Lawson Cypress. They are not most desirable for street work, but are entirely useful in park work as the group offers a considerable variety of color and texture which is a desirable feature among evergreen foliage plants.

The Lindens.

The Lindens (Tilia sp.) are commonly found on the parkings but rarely in systematic plantings. They form shapely trees with a semi-globular head. The leaves, however, are very coarse in those species whose leaves are covered with many fine hairs, often turn a very dingy, rusty color during the autumn months. The blossoms, which are not very showy, are quite fragrant and are freely visited by bees. These flowers are followed by small berries which are often conspicuous because of the peculiar blade-like structure, for which they grow, which aids in their distribution by the wind.

Both American and European forms have been noted. (Tilia americana; T. europaea).

The Brisbane Box.

This tree (Tristania conferta) is a handsome evergreen tree, with broad shining leaves somewhat resembling the broader forms of Eucalyptus leaves. The tree bears clusters of rather showy white flowers.

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The common Bald Cypress (*T. distichium*) was not noted but is quite similar to the above except that the foliage, a trifle larger than that of the preceding. There are splendid specimens of this tree at Berkeley.

Thuya sp.

Various species of Arbor vitae are to be found throughout the state. Some of these are native but most of them are introduced species. They are trees resembling, in general characteristics, the Incense Cedar and Lawson Cypress. They are not most desirable for street work, but are entirely useful in park work as the group offers a considerable variety of color and texture which is a desirable feature among evergreen foliage plants.

The Linden.

The Linden (Tilia sp.) are commonly found on the parkings but rarely in systematic plantings. They form shapely trees with a semi-globular head. The leaves, however, are very coarse in those species whose leaves are covered with many line hairs, often turn a very dingy, rusty color during the autumn months. The blossoms, which are not very showy, are quite fragrant and are freely visited by bees. These flowers are followed by small berries which are often conspicuous because of the peculiar blade-like structure, for which they grow, which aids in their distribution by the wind.

Both American and European forms have been noted. (Tilia americana; T. europaea).

The Brisbane Box.

This tree (Tristania conferta) is a handsome evergreen tree, with broad shining leaves somewhat resembling the broader forms of Eucalyptus leaves. The tree bears clusters of rather showy white flowers.

The tree has a good oval, pyramidal form and is a sightly tree. Its chief objectionable feature is the fact that the leaves drop in larger or smaller intervals throughout the year.

The Elm.

The Elm, and chiefly the American Elm (Ulmus americana) is not often found in the southern part of the state because there are so many better trees. It grows well both in the coast and in the interior towns and in the interior is especially valuable because it withstands the extreme summer heat better than most deciduous species.

In nearly every case where the elm has an opportunity to sucker it will do so and where these suckers gain any headway it is almost impossible to eradicate them. Occasionally, if conditions are just right, a very abundant crop of seedlings will appear but this is not often and as is the case with most seedlings, mortality is very high and the rest can easily be destroyed. This feature of suckering is enough to black-list the elm in many places and is most noticeable in the case of the Cork elm (U. racemosa) and its varieties.

The California Laurel.

This is a native tree (Umbellularia californica) which occasionally has been left on the parkings. Under advantageous conditions it makes a very handsome tree. As it usually grows along streams and washes in the canyons, the trees often become top-heavy, produce too many leaders and a very light root system, with the result that heavy winds or rains often blow them down. Isolated trees have come to our notice, which, on the other hand, have been kept to a single leader and have been planted where they had to make a firm root system. Here they have attained striking size and symmetry.

Of course it can be urged that the shade cast is very dark; that the wood is at best rather brittle; and that the fruits are large and unpleasant underfoot. All of these are valid objections but if the trees are set far enough apart and in a position not subject to violent winds, the first two can be, in a large

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measure, overcome. The latter has no remedy. It is, perhaps, needless to note that the laurel makes its best growth where there is considerable soil moisture, but not enough to cause the formation of a superficial root system.

This is a tree open for trial. It has not, as yet, been proven and we can only urge that plantings be made at some suitable place where the public is willing to contribute to our general fund of knowledge by a demonstration.

The following lists are at best generalizations and as such are to be used with extreme caution. A statement of fact in one locality may be entirely without weight in another community. In using the appended tables, the planter must compare the data given with actual results as shown by the trees in his neighborhood. It is impossible to give lists which will hold for all parts of this state. We have here considerable sectional variation in soil, temperature and moisture conditions, as well as variations within the section. This latter may be noted especially in soil and moisture, even in the length of a single street in some districts.

Do not therefore, accept the lists as final. Use them as a starting point and modify as your conditions must demand. A few points may be useful as guides in original work.

1. If your summer temperature is high and humidity low, do not use many deciduous trees of Eastern origin. Do not use conifers, with few exceptions, as the dust conditions are particularly trying to them.

2. If the water supply is slight (i.e. the natural supply after trees are established), if this is slight, do not select species needing abundant soil moisture.

3. If there is alkali, use trees which will tolerate such amounts as may be present.

4. Select trees which will harmonize with native vegetation. Do not plant species characteristic of arid regions in the semi-humid parts of the state and do not plant trees characteristic of humid regions in the arid portions of the State. While all street work must be artificial to a slight degree, there is a certain fitness of things which is essential.

Trees causing considerable litter all the year.

Albizzia lopantha
Eucalyptus sp.
Eriobotrya japonica
Ficus macrophylla
Grevillea robusta
Lagunaria patersonii
Magnolia grandiflora
Melia azadarach
Morus alba
Morus rubra
Sterculia diversifolia

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Trees flowering considerable time all the year.

Albizzia lophantha
Eucalyptus sp.
Erioboterya japonica
Ficus macrophylla
Grevillea robusta
Leguminia peterssonii
Magnolia grandiflora
Melia azedarach
Morus alba
Morus rubra
Sterculia diversifolia

Trees causing litter from fruit.

Albizzia lopantha
Castanea sp.
Eriobotrya japonica
Eucalyptus sp.
Ficus sp.
Ginkgo biloba
Grevillea robusta
Melia azadarach
Morus sp.
Olea europea
Pistacia terebinthus
Prunus ilicifolia
Prunus integrifolia
Robinia pseudacacia
Schinus molle
Tilia europa
Ulmus sp.
Umbellularia californica

Conifers useful only on widest roads where wide parking space is available.

Araucaria sp.
Cedrus atlantica
Cedrus deodara
Cupressus arizonica
Cupressus guadelupensis
Cupressus macrocarpa
Pinus sp.

Trees especially short lived IN GOOD FORM.

Acacia Baileyana
Acacia pycnantha
Acacia saligna
Acer saccharinum and its varieties
Albizzia lopantha
Betula alba and its varieties
Cupressus macrocarpa
Pinus radiata
Platanus occidentalis

Trees needing abundant soil moisture

Acer sp.
Betula alba
Ginkgo biloba
Liquidambar styraciflua
Liriodendron tulipifera
Magnolia grandiflora
Quercus suber
Sequoia sempervirens
Taxodrum sp.
Umbellularia californica

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Sequoia sempervirens
Taxodrum sp.
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Trees which will endure drought.

Acacia sp.
Casaurina sp.
Cupressus arizonica
Eucalyptus sp.
Fraxinus velutinus
Koelruetaria paniculata
Libocedrus decurrens
Pinus halepensis
Quercus agrifolia
Quercus lobata
Quercus wislizenii
Robinia sp.
Triacanthos glandulosa
Ulmus sp.

Small Trees.

Acacia retinoides
Betula alba
Caesalpenia sp.
Cassia tomentosa
Eriobotrya japonica
Eucalyptus erythronema
Eucalyptus polyanthemos
Eucalyptus pulverulenta
Eucalyptus Risdonii
Jacaranda mimosaefolia
Lagerstroemia indica
Ligistrum lucidum
Nerium oleander
Pittosporum sp.
Tamarix sp.

Native Trees of Interest.

Acer macrophyllum
Acer negundo var. californica
Lyonothamnus floribundus and var. asplenifolius
Prunus integrifolia
Quercus agrifolia
Quercus californica (Kelloggii)
Quercus lobata
Quercus wislizenii

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The following species of palms and related plants were noted:
Those marked with a star are the most desirable of their class.

Chamaerops excelsa - of rather shabby appearance.

Chamaerops humilis - similar to proceeding but more slender.

*Cocos plumosa - very good in frost free places.

Dracaena draco - too bulky for parkings

Dracaena indivisa - poor

D. australis - shabby in age

*Phoenix canariensis - good for very wide parkings.

P. dactylifera - suckers badly.

P. reclinata - suckers badly.

P. roebellini - for pots or lawns only. Small

Seaforthia elegans -

Erythea edulis - rapid fan palm.

* Washingtonia filifera - Fan palms; wide parking.

*Washingtonia robusta - fan palms, less parking than above.

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CHAPTER IV.

The Local Problem.

Before any reasonable planting can be done there must be a careful study of the street or streets to be planted. There should be a complete record, including statistics, as to the nature of the soil, the width of the street, parkings and side-walks, the nature of the buildings - whether residential or business - the direction of the street and prevailing local sentiment.

California cities are particularly fortunate in regard to the matter of soil. In most cases it does not need to be especially considered. These soils do show great variation and a knowledge of the variation is essential. A knowledge of the depth of soil is also of advantage. For example, in Santa Barbara streets which run from the hills to the water front as State street does, show differences in soil depth, the soil on the higher levels being much more shallow than that on the lower level. Again, in San Diego, all that part of town built on the mesa, which in most ways is the best residence district, has a great handicap in having hardpan very close to the surface of the soil. Here is a very large problem for San Diego to work out. The inevitable practice will be blasting. This necessitates that planting will be done before the street work is done, which is the wisest practice in any case. Of course this will entail extra labor and forethought as the true level of the street must be ascertained in each case before planting. A sufficiently large area must be opened up for each tree so that it will not be a tiny pocket of good soil in a large mass of rocks. And good soil must be put in place. All of this means expense - and great expense.

The best way of meeting this expense is another problem. If the cooperation of the property holders is to be attained it is evident that an expense of forty to fifty dollars cannot be demanded offhand for each hundred feet or so of frontage. Some way must be found to give time for payment, or some other way. San Diego has done much good municipal work in her forestry work that there is no doubt she will find a way out of this matter.

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The Local Problem.

One other solution, which may lessen expenses slightly was offered for San Diego by one who knows the conditions there. It was based on the fact that the climate of San Diego is of such mildness that it is not greatly dependent upon shade for its comfort. The idea was this: 'Why not substitute a pergola treatment, with vines, to occur at intervals instead of the trees. Not a large formal affair, but a small pergola adapted to the lines of an arbor, of real architectural merit and well planted.' This is a tentative idea calling for much more thought before acceptance or rejectance.

The general requirements of trees are that the soil should be of reasonably fine texture so that water does not drain away too readily or stand too long so that baking is the result afterwards. Where the soil does not answer these requirements it is highly profitable to make some effort to improve it. In those towns where there is an adequate street cleaning department, the sweepings, provided they do not contain too much rubbish, are often useful in adding humus to the soil. Where all the earth must be supplied the best possible should, of course, be obtained.

The old saying that the spread of the roots is proportionate with the spread of the tops, often leads one to wonder how street trees can survive. For them the soil should be at least three feet deep and should be in good condition for as large a radical distance from the trunk as possible. With these conditions the trees can usually adapt themselves to their other limitations.

One point which is sometimes over-looked, is that soil which was below the original grade and is now surface soil may or may not be fit soil for planting. In very deep soils, it does not make much difference but usually the first three feet of soil are of better quality than the subsoil. A fill on the other hand often gives good soil for planting, depending, of course, upon the original source of the dirt. One danger might possibly arise and that is that the fill might be of more porous soil than the original grade with the result that the water might stagnate along the old grade level. All these points must be cared for.

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On most streets we find provisions for planting made in strips of parking of

varying widths along the outer edges of the pavement. These are broken only for driveways and entrance paths. The matter of width is one worthy of considerable attention. As we find them today they vary from eighteen inches up. Obviously it is absurd to plant a tree in an eighteen inch parking, but it is done and people wonder why the pavements are lifted! For the best success of the trees the parking space should be four feet at the very lowest and a strong preference for ten foot parkings. For some species, particularly palms, peppers, oaks, etc., fifteen feet is none too large.

The roadways vary largely in width and in many cases are too wide. The width must be determined, of course, by the amount and nature of the traffic along the street. Hence, residemtial streets need not be so wide as business streets. Extra width in residential districts means money wasted in paving, a greater surface to develop dust and a minimizing of parking space thus bringing the dust closer to the homes and to the pedestrian on the sidewalk. In talking with a street superintendent of a certain town which has very good streets, most of which are eighty feet in width, the opinion was expressed that thirty-five feet was sufficient space for the road and that the rest should go into the parking and pavement spaces. This would produce a spacing as in Fig. . Other arrangements might be made by varying the width of the parking, the width of the pavement or width of the strip between pavement and property lines or by varying any two or all three.

The question of a central parking space has two distinct phases. The first is the case of the residential street which is very wide, at least one hundred feet. Then a wide parking space can well be spared from the center of the roadway and if judiciously planted will add much to the beauty of the street. In most cases this central space is used for shubbery planting and for nothing else. Of course in the case of still wider streets with a central carline a planting of trees might well be used. This has been done in Washington along Pennylvania Avenue, the diagram of which see in Fig. . The other phase of the central parking is the case of the narrow street flanked by tall buildings where there

are no side parkings and a tree has best chance for life in the central space where it can get a maximum of sun and air. Of course this practice does not give wonderfully beautiful effects but is has considerable merit over no planting at all and if properly carried out might have considerable formal dignity.

The spacing in the parking depends largely upon the species. The distance between curb and sidewalk should be about half and half with the tree nearer the sidewalk than the curb if there is any difference. As to spacing between specimens one might generalize and say at least twenty feet more than the spread of the top at maturity and for trees producing very dense or black shade twenty- five or thirty feet more. For palms or trees whose maximum spread is soon attained with little chance of an increase, the distance added need not be so great, but a planting of palms too closely set takes from their dignity and formality, rendering them rather less elegant. This spacing must be done with consideration of the best needs of the street and not with regard to the property frontages, although most owners will, doubtless, object if there is not a tree in front of their place.

In most cases the plan will call for uniform spacing but the problem of poles, lamp-posts, water hydrants, house-water and gas connections will interfere and then a respacing of all the trees should result and not merely the moving of the one specimen which cannot go in place. Mr. Solataroff[1] gives the ruling "that trees should be kept away at least eight feet from lamp-posts and about ten feet from water hydrants". Another phase of the question of spacing which may come up in the treatment of narrow streets is the question of opposite or alternate planting. For extremely narrow streets the latter is advisable but in other cases the form gives rather more attractive results.

In Los Angeles it was noted that a few streets had been planted with trees between the inner edge of the side-walk and the property line leaving no other parking. This gives an excellent opportunity for the development of the tree but is rather poor since it gives a maximum of shade to the house with a minimum to the roadway and to the pedestrian. The effect is also somewhat unfinished.

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1. Shade Trees for Towns and Cities, page 76.

The use of a double row is never advisable since a hedgelike growth soon results, which cuts off all light and air.

The question of one or more species to the street has many adherents on both sides, but the followers of indiscriminate planting have yet to produce a street in California which is really ideal. By indiscriminate planting is meant a mixture of species and not a combination of species in a definite plan to produce a certain landscape effect. The custom alternating two species is very common but from those examples noted, it seems hardly as desirable as a planting of one species.

These are questions which must be determined on the ground and for which there is no help but a fine sense of the fitness of things.

CHAPTER V.

THE PLANTING OF STREET TREES.

At first thought it might seem that street trees would need no more careful planting than any other tree, but if we consider how much more artificial are the conditions under which it must live, we can see why special care should be paid to this feature. Here of course is the stumbling block for many ambitious enterprises. And that is, the expense of adequate preparation.

From actual practice it has been found that for best success a hole, at least three feet in length for each of the three dimensions, should be excavated. If the nature of the soil does not demand an addition of fertilizer, the top soil is put at the bottom and the lower soil was brought to the top. In most cases it will pay best in the end to add some fertilizer. In some cities the street sweepings are saved and used for this purpose. These are quite excellent for lightening the consistency of the soil but vary considerably in their value from the food standpoint. Again, if the soil is of a very clayey nature, the addition of lime is a valuable point to remember. Fig. represents the method of work in a very good soil naturally approaching the ideal. Fig. represents the method employed by a local stock company of citizens, which cares for their plantings, in Garvanza. This method is to be recommended over the preceeding in any case. In cases of specially clayey soil this company adopts the following method of using lime to free the soil particles. Fig.

It has been found that by the time the roots of the tree reach the lower levels ( ) that the lime has spent itself and broken up the colloidal clay so that the soil is easily penetrated by the roots.

At all plantings, arrangement is made for watering. Fig. Usually the top six inches of soil is kept loose so that it can be drawn back to form a rim and the hollow flooded. After the water has disappeared this loose material is thrown back as a mulch. For planting on hillsides the tree is placed as in Fig.

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If, in addition to the dry soil mulch, stable litter or even dry grass can be added, it will be of advantage. After planting the tree should be staked and for obvious reasons, the stake should be on the side nearest the source of the prevailing winds. Usually one strong stake, eight to ten feet high, will suffice and this can usually be removed after the sixth or seventh year.

These holes should be prepared before the trees are obtained so that the soil may have time to settle.

At this point it might be well to consider the tree for the planting. This tree as it comes from the nursery should have a good syetem of roots with a large proportion of fibrous roots. The main stem should be unbranched, so that it will keep unbranched for at least twelve feet. If this point is assured there will not be so much pruning needed later, to keep the tree in good form. Of course there are some species which will have to be headed even higher, but these cases can be determined in local practice. Since even with the greatest of care some of the root system is lost in transplanting a corresponding reduction must be made in the top. This top pruning can be well done only by careful study of the individual tree so that the new growth starting from the undeveloped buds will be able to grow along the most desirable lines. Some specimens grow symmetrically by nature and call for little effort on the part of the nurseryman to maintain a good shape. On the other hand, there are a great many species which need considerable care. A case in point would be the popular camphor tree. This tree, as it usually occurs on parking spaces, is headed quite low. This is the nature of the tree. But according to competent nurserymen this habit can be overcome by a careful training in the nursery. The mature head of the camphor tree is broad and spreading and if we have thathead forming some five or six feet above the ground level, it is inevitable that it should interfere with pedestrians. At best the conditions are very artificial and limited, yet the utilitarian aspect of the problem cannot be overlooked. So then, when we accept our conditions, we must be forced to realize that for comfort to pedestrians, free play of light and

air, our trees must be headed higher. How to induce this, is a problem for our nurserymen and we must demand good materials from him and be willing to pay for the extra care that they must have.

Another case which demands special nursery care is that of the Texas Unmrella Tree. It is urged that this tree be abandoned for street work but it offers such a good example that it is used here merely to illustrate the point in hand. If left to its own devices the tree branches a foot or so from the ground level and produces a multitude of coordinate branches which produce a great thickening which is easily broken in wind or rain storms. The problem is this. Can branching be induced after a better leader has been formed and can the young tree be pruned so that fewer branches are allowed to develop and hence a safer stronger crotch be formed?

A somewhat similar problem is confronted in the case of the Carob Tree (Ceratonia siliqua). As was shown in Fig. the tendency of the tree is to form several leaders which develop horizontally and after developing great thickness split off breaking with them much of the main trunk. This problem is more difficult to solve and it is not, as yet, assured that it can be overcome.

And so examples might be multiplied without number. The point of the matter is this; use only first class nursery stock and expect to pay for it. Examine your treee; see that they are healthy and free from insect pests; see that they have developed normally and are not trees which have made the best of bad conditions; see that they have grown vigorously and have never been stunted or root bound. Then give them a place to grow which gives them every opportunity for an optimum development, and then do not sit down and await results but give them constant care, for one cannot expect reasonable development with no care at all.

To all this, there will probably be raieed the objection of expense. Most assuredly there will be some extra expense, but these matters need not take much more work than in ordinary nursery practice and it is to the advantage of the

nurseryman to turn out good specimens for municipal use. Furthermore, these plantings are being made for a great number of years and an additional expenditure at the beginning may save an endless amount of worry, time and expense in correcting bad work later on. And bad work corrected is at best far less desirable than good work from the first.

The Time to Plant. This feature will vary somewhat according to the locality, the species, and the facilities for care afterwards. From general practice, it might be said that it is safe to plant in the spring after the hardest, coldest rains are over until the early summer months. Some species are more tolerant and resistant than others and can be planted all through the summer months. Many more species can be planted all through the summer and early fall as well, if they are specimens which have been grown in cans or tubs, or have been transplanted so often that a good mass of roots are formed. The advantage of this method is that the work is less of a shock to the tree and, provided a sufficient supply of water can be given afterwards, many of the less tolerant forms can be given this treatment. In using specimens from tubs or cans care must be exercised that no deformed or root-bound specimens slip into the lot.

The safest generalization is, of course, that planting should be done just as new growth is starting so that the tree may become established at once and not have the shock of losing foliage and roots which would come if it were moved after growth had started. Nevertheless, if the planter is willing to meet the difficulties the question of time can be largely disregarded.

After planting has been accomplished, a small matter of great importance must not be overlooked. And that matter is the staking of the tree. In spite of all precautions at planting time, the ground often settles or subsequent rains or winds disturb the position of the young tree so that it begins to careen at an angle and unless promptly corrected, this crooked shape is kept for all time. The simplest method for preventing this and the one which has been proven satisfactory and sufficient is the single stake. As a general practice stakes from ten

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to fifteen feet in length should be used with three feet below ground. The portion below ground should be tarred so that it will not decay. If the tarred area is carried up for a foot above ground level the danger is lessened still more. If these are driven in about ten or twelve inches from the base of the tree the root will not be damaged and the tree will be held in place. The usual practice is to tie the tree to the stake at several points with soft hemp rope. If this can be run through rubber hose - so much the better. After eight or ten years the trees have usually outgrown the need of the stake and it can be removed, repointed and retarred and used for other smaller trees.

In many cities it has been found that trees are subject to mutilation by horses, especially. And Figs. and show that the damage is considerable if not remedied. There are two methods of combatting this difficulty.

The way very commonly used in the East and in a desultory way by private individuals in California, is to provide a guard of some description. These guards vary from a roll or two of two inch hexagonal wire mesh, to a wooden frame such as is commonly used in Washington, D.C., or an elaborate iron guard. For old trees the wire mesh guard is entirely adequate and for young trees a wire mesh guard supplemented with stout stakes, will answer all purposes. The wooden guard is a little more effective and is reasonably durable. The only advantage of the iron guard is its durability and in some cases, its beauty. Unfortunately, there are many times when it is not a thing of beauty. Of all these, the iron guard is the most durable and the most expensive, the expense in most cases being prohibitive.

Instead of incurring this expense, some of our southern California towns have enacted ordinances which prevent hitching to or near a tree, within a certain distance. At first there were a few violations, but now it is the accepted scheme of things and so far as was noted, there are no cases of mutilation of bark or trunks of trees in those towns. Whether this would hold in a great city or not, we cannot say. Certainly the intense civic pride of these cities does much to make their respective ordinances effectual.

When we begin to have our trees uniformly throughout our towns, one other feature will rise to importance. That is, - the use of grills in the down down district. A grill is a cast iron screen of some kind which is put over the soil about the base of a tree to prevent its being packed down by tramping. Every tree must have a certain area of unpaved soil about its base or it cannot live and thrive. And in those parts of the town where there is a great amount of walking too and fro the ground becomes packed down so that it is no longer easily permeated by air and water. In this state the tree cannot thrive. It is to prevent this that the grill is useful. These grills are, at best, an item of considerable expense, but they are a means to an end which is worth far more than any expense at first hand. Fig. shows the appearance of a grill from the surface and in section.

Subsequent care. All trees, of course, receive a thorough watering at the time of their planting but there must be systematic watering after that. It has been found that it does not pay to leave watering to theindividual property owners. At best they are prone to forget and if the trees will show difference of treatment, there will be irregularity in the planting which will mar the whole effect.

To prevent this it is desirable to have the watering done by the city. If the city takes charge the expense is kept down and a systematic treatment is assured During the first three years of the tree's life on the streets it must be watered with the greatest care. After its first watering, it is usually watered every two or three weeks during the summer until the winter rains begin. The second year once a month will suffice and in some cases, every other month. The third season is usually confined to helping along the backward trees with water for the others if necessary. Palms very often need it during a third season. Backward trees and trees which show irregular growth, as camphor or live oak, must have more frequent and more copious waterings than the normal specimens or more even growing species. Also, trees in situations which are more exposed or which are in soil which does not retain its soil moisture freely, need special attention.

The Amount of Water to be given to each tree varies according to many factors. Trees after planting need more than established trees; trees with shallow roots need more than deeply rooted trees; trees in very porous soil need more moisture than normal soils and certain species need more than others. A case in illustration of the last point will be found among the acacias. Acacia melanoxylon will use all the water obtainable while A. decurrens dealbata will suffer with the same amount or thrive with less. Every one would realaize that a Magnolia, a Liriodendron or a Redwood would want more moisture than a Eucalypt or a Desert Palm.

So far very little has been done in the way of fertilizing and cultivating the street trees. So far as was noted but one case of artificial fertilization was seen. This case was a planting of Acacias on a poor soil which was very rocky. The fertilizer used was barnyard manure mixed with the soil from the four-foot hole. Certainly these trees gave no evidence of poverty of soil. Similar instances have been found for individual trees which do not mature rapidly. Chemical fertilizers, chiefly mixtures of acid phosphate and muriate of potash, have been tried in the East with good results but no records are at hand for their use here. Occasionally street sweepings are saved and incorporated with the soil, but their action is often as much physical as it is chemical.

As to cultivating - it is the general practice to keep the soil free from weeds and grass about the base of the trees. In most cases, an effort is made, with varying success, to keep the soil stirred about the base of the trunk. This insures a dry mulch and hence a preservation of water and an aeration of the soil which is greatly to the advantage of the tree.

As has been stated before in the consideration of the nursery stock, the training and pruning of the tree must begin in its earliest infancy. Since our street is laid out on formal geometrical lines and its purposes are so strongly utilitarian, some concession must be made to service in the training of a tree. The chief work in the nursery is to insure one single straight leader. There may be strong lateral branches but there must be one still more vigorous central leader.

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As it is the Californian practice to plant trees from eighteen inches to three feet high directly in position, all further training must be done upon the street. Hence we can see the necessity of the firm strong stake advocated before. As young trees of this size do well, there is no reason to discourage this practice. The only disadvantage is that in having trees spread over the city, some may escape notice. The tree comes from the nursery to the street with a single leader and many lateral branches. One by one these lateral branches are removed throwing the strength into the main leader. This leader must be watched that it keeps an upright position. Eventually the lateral branches will have been removed far enough up the trunk and there they can be allowed to develop.

For most trees it is best to have but a single leader throughout the entire development. There are many exceptions of course. But the greatest generalization is a single leader with a few good lateral branches which must branch in turn and so on. In watching the growth of the tree certain primary lateral branches will be stronger than others. Of these, certain ones will be most desirable. The less desirable ones with the weaker branches should be thinned out and the lateral branches treated in a similar fashion for their secondary branches until we have a symmetrical head. To determine what branches should be left and which removed, one must study the natural habit of the tree and determine what procedure of pruning will give a least artificial appearance unless a frankly artificial system of pruning is followed.

Certain other methods of pruning have come to notice. For example, it has been obeerved at Los Angeles and at Riverside that Acacia melanoxylon, if left to grow untouched, will produce a rather irregular pyramidal crown. If, however, the top is severely cut out when the tree is four or five years old, the resulting crown is more rounded and satisfactory. So far, all the trees so treated are but seven or eight years old and the mature habit is as yet undetermined. In any event, the untrained trees are very often of most unkempt and straggling habit. The tree has a fashion of forming several leaders along divergent lines with most

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unhappy results . Where, however, the trees develop well along natural lines it has a fine pyramidal style.

The common practice of beheading is often noted for Eucalypts, peppers, poplars, umbrella trees and others. All of these trees have remarkable powers of refurnishing themselves with branches but the practice certainly does not add beauty in most instances. The eucalypts can be kept in bounds in no other way in the city streets, i.e. of course, those species which have the very tall columnar habit. Peppers are usually so treated for black scale infestations and seem none the worse for it. Poplars, umbrella trees and others are usually so treated to reduce the amount of shade and are hopelessly disfigured for a time. This practice has its value but is not a legitimate phase of pruning but rather a makeshift for convenience.

If, however, the individual is studied and the pruning done yearly after active growth has ceased for the big pruning, and from time to time for small items which call for individual attention there will be produced a uniformity which will aid the utilitarian aspect of the street equipment without affecting to any great degree the individuality of the specimens.

The highest form of pruning for street trees is that form which does not show in any way and yet affects the desired results. In accomplishing this, of course, great care is required. Constant attention during the first few years will regulate the form of the trunk and main branches. After this, the pruning devotes itself largely to minor details. Constant observation will show any dead or diseased limbs which should be promptly removed. In the same way, branches which tend to grow at irregular angles can be curbed. In all cases where smaller branches are removed care should be taken that the cut should be made just beyond a point where growth can be carried on in the desired direction. By this forethought oftentimes considerable work can be saved later. Should the crown become too dense it should be thinned out from time to time. In doing this the inner branches should be removed and the smaller ones so that the shape and outline of the tree will not be seriously modified.

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All of these operations call for continuous work more or less all of the time. In California there is not, strictly speaking, any period when there is no growth of any kind. But it can be safely said that the greatest activity is in the spring and early summer. If then a minimum of pruning is performed during that time, with reasonable discretion, it may be carried on through the remainder of the year, leaving the heavy work till the winter when the least amount of sap will be flowing.

In spite of the fact that much notice of it has been made in recent years, we still find many cases of bad pruning - so general rules for all pruning may not come amiss.

First of all, in large trees, commence pruning at the top of the tree and work downward in this way saving labor of going back to dislodge any limbs which may have been caught. And, needless to emphasize, perhaps, the pruner should know from preliminary study just what he wants to cut before climbing the tree as the aspect of the tree is very different in the crown from the aspect in the street. In making the cuts, the saw should be held so that the plane of the cut is parallel to axis of the trunk and reasonably close to the trunk so that no stub or even suggestion of a swelling will be left when the scar has healed.

The branches are often cut off with a stub of varying size left in place. This, in time, has formed about it a collar by the succeeding years' growth of new wood. The dead stub, however, gradually decays and breaks off leaving an opening into the main trunk which offers an easy entrance for fungus growth or insect pests. Figs. indicate the progress in this case.

Again, unless the cut is properly made the limbs split and tear away parts of the main trunk as they break. To prevent this the cut should be made with an undercut first and then an overcut as shown in Fig. This may take more time but it prevents such splitting as is shown in Fig. For smaller limbs for which pruning shears are sufficient this method cannot be followed but the dangers of splitting are not incurred.

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Pruning shears are most often used to limit the growth of a lateral branch. In this case, of course, the process is simple but care must be taken to make the cut so that a bud can carry on the growth of the branch as under other circumstances the limb will always show as a stub. It is always well also to make the cut a short distance beyond the bud, because if too close to the bud evaporation will set in and spoil the bud, at least stunting it.

For all the larger cuts it has been found best to use a dressing of some kind of paint over the wound and so prevent decay. If the wound is made in a proper fashion leaving a flat surface parallel to the axis of the trunk or limb, the tissues of the cambium will grow and differentiate the cells of the bark which eventually cover the entire scar forming a cambium layer over the entire surface and a barky layer over that. The difference in the appearance of the bark will always show but the functions of the tissues will be resumed in a normal fashion as though no branch had occurred. And the wood rings will be laid down about it, increasing the diameter of the trunk as though nothing had happened.

By using a dressing which will keep out moisture, decay is prevented and at the same time any fungus spores are offered a poor chance for germination or growth. General practice has sanctioned the use of some paint preparation usually of such a nature that it will penetrate into the surface for some little distance and not form a hard coat on the surface which will crack and chip off under the action of the weather. There is often used a preparation of coal tar. Providing this mixture does not contain any substances which are injurious to plant tissue, this is very satisfactory, but from notes taken in the field, those who have used it say that it is a little harder to obtain and has no great advantage over a good paint mixture.

Hints to Tree Climbers. The Department of Parks of the Boroughs of Brooklyn and Queens issues, in pamphlet form, the following "Hints to Tree Climbers" to its men:-

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"1. Before starting out on a tree, judge its general condition. The trunk of a tree, that shows age, disease, or wood-destroying insects generally has its branches in an unhealthy condition. Greater precautions should therefore, be taken with a tree in this condition than with a young vigorous tree.

"2. The different kinds of wood differ naturally in their strength and pliability. The soft and brash woods need greater precautions than the strong and pliable ones. All the poplars, ailanthus, the silver maple, the chestnut, the catalpa and willow are either too soft or too brittle to depend on without special care. The elm, hickory and oak have strong flexible woods and are therefore, safer than others. The red oak is weaker than other oaks. The sycamore and beech have a cross-grained wood and are therefore, fairly strong. The linden has a soft wood while the ash and gum[1], though strong and flexible, are apt to split[2].

"3. Look out for a limb that shows fungus growths. Every fungus sends out a lot of fibers into the main body of the limb which draw out its sap. The interior of the branch then looses all strength and becomes like powder. Outside appearances do not show the interior condition but one can be sure that every time he sees a fungus cropping out, there is trouble behind it and the limb is not altogether safe.

"4. When a limb is full of holes or knots, it generally indicates that borers have been working all kinds of galleries through it, making it unsafe. The silver maple and sycamore maple are especially full of borers, which, in many cases, work on the under side of the branch, so that the man in the tree looking down cannot see its dangerous condition.

"5. A dead limb with bark falling off indicates that it died at least three months before and is, therefore, less safe than one with its bark tightly adhering

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1. This refers Tulepo or Nyssa, and Liquidamber sp. not Eucalyptus.
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"6. Branches are more apt to snap on a frosty day when they are covered with an icy coating than on a warm, summer day.

"7. A rainy or drizzly day causes the branches of a tree to be slippery and greater precautions are then necessary.

"8. Always use the pole-saw and pole-shear on the tips of long branches, and the pole-hook in removing dead branches of the ailanthus and other brittle trees where it would to too dangerous to reach them otherwise.

"9. Examine your ladder before using it.

"10. Be sure of the strength of your branch before tying an extension ladder to it.

"11. Do not slant the extension ladder too much.

"12. Always watch the upper end of your ladder.

"13. Do not forget to use the 'danger sign' on streets where falling branches are apt to injure careless passers-by.

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CHAPTER V.

Legislation.

Legislation concerning the planting and subsequent care of street trees, in California, has been largely confined to various city ordinances. Some of these have proved most satisfactory and others of little value.

The ordinance which is effective in Riverside, is a simple one, and yet from all reports, it is altogether effective in its operations. It is given below in full.

Ordinance No. 4.
(New Series).

An Ordinance Regulating the Planting, removal and care of trees and shrubs in the Streets of the City of Riverside.

The Mayor and Common Council of the City of Riverside DO ORDAIN AS FOLLOWS:

Section 1. No trees or shrubs shall hereafter be planted in the public streets of the City of Riverside, except under the direction of the Board of Park Commissioners of said City.

Section 2. No trees or shrubs planted or growing in the public streets of said City shall be removed except by the permission of said Board of Park Commissioners, and no trees in the streets shall be cut, pruned or trimmed except under the direction of said Board; nor shall anyone not authorized by the Board of Park Commissioners trench around or longside of any tree, plant, or shrub with a view to cutting the roots of same.

Section 3. Said Board of Park Commissioners shall exercise general care and supervision over all trees in the streets of said City, and shall select the variety of trees hereafter to be planted in the streets of said City.

Section 4. Any person violating any of the provisions contained in Sections 1 and 2 of this Ordinance shall be deemed guilty of a misdemeanor, and shall be punished by a fine not exceeding One Hundred Dollars ($100), or be imprisoned for not exceeding thirty days, or by both such fine and imprisonment.

Section 5. All ordinances and parts of ordinances conflicting with the

CHAPTER V.

Legislation.

Legislation concerning the planting and subsequent care of street trees, in California, has been largely confined to various city ordinances. Some of these have proved most satisfactory and others of little value.

The ordinance which is effective in Riverside, is a simple one, and yet from all reports, it is altogether effective in its operations. It is given below in full.

Ordinance No. 4.
(New Series).

An Ordinance Regulating the Planting, removal and care of trees and shrubs in the Streets of the City of Riverside.

The Mayor and Common Council of the City of Riverside DO ORDAIN AS FOLLOWS:

Section 1. No trees or shrubs shall hereafter be planted in the public streets of the City of Riverside, except under the direction of the Board of Park Commissioners of said City.

Section 2. No trees or shrubs planted or growing in the public streets of said City shall be removed except by the permission of said Board of Park Commissioners, and no trees in the streets shall be cut, pruned or trimmed except under the direction of said Board; nor shall anyone not authorized by the Board of Park Commissioners trench around or lengthen of any tree, plant, or shrub with a view to cutting the roots of same.

Section 3. Said Board of Park Commissioners shall exercise general care and supervision over all trees in the streets of said City, and shall select the variety of trees hereafter to be planted in the streets of said City.

Section 4. Any person violating any of the provisions contained in Sections 1 and 2 of this Ordinance shall be deemed guilty of a misdemeanor, and shall be punished by a fine not exceeding One Hundred Dollars ($100), or be imprisoned for not exceeding thirty days, or by both such fine and imprisonment.

Section 5. All ordinances and parts of ordinances conflicting with the

provisions of this Ordinance are hereby repealed.

Section 6. This Ordinance shall be in force and take effect thirty days after its adoption and approval.

Section 7. The City Clerk shall certify to the passage and approval of this Ordinance and cause the same to be posted as required by law.

APPROVED this 25th day of July, 1907.

The ordinances passed by the City of Redlands are somewhat numbrous but are equally effective and satisfactory in operation.

Ordinances of the City of Redlands, California.

Article III. Sec. 29. Sub-division 5. Trimming Trees. It shall be unlawful for any person to permit the branches or foliage of any tree, plant, hedge or bush to obstruct the free passage of vehicles in the roadway of any street, or of pedestrians upon the sidewalk portions thereof, or to hang over such portions of such sidewalk within seven feet of the surface thereof.

Sec. 29. Sub-division 6. Cutting Trees. It shall be unlawful for any person to cut or permit the cutting of any tree or the roots or branches thereof being or growing upon any street in said City, or to in any manner injure or impair the growth or life thereof, without first obtaining a permit to do so from the Board of Trustees or the Tree Warden, or Tree Commission: provided that nothing herein shall prevent the proper trimming of trees as provided in Subdivision 5 hereof.

Article X, Sec. 80. Appointment of Commission. There is hereby established a Tree Commission, to consist of three members to be appointed by the Board of Trustees and to serve at the pleasure of the Board, and the executive officer of such Commission shall be known as the Tree Warden.

Sec. 81. Power and Authority. Said Commission is hereby vested with power and authority to take charge of and supervise the care and maintenance of all public parks and the planting, trimming and removing of all trees upon the street and public places of the City.

provisions of this Ordinance are hereby repealed.

Section 6. This Ordinance shall be in force and take effect thirty days after its adoption and approval.

Section 7. The City Clerk shall certify to the passage and approval of this Ordinance and cause the same to be posted as required by law.

APPROVED this 15th day of July, 1907.

The ordinances passed by the City of Redlands are numerous but are equally effective and satisfactory in operation.

Ordinances of the City of Redlands, California.

Article III. Sec. 29. Sub-division 5. Trimming Trees.

It shall be unlawful for any person to permit the branches or foliage of any tree, plant, hedge or bush to obstruct the free passage of vehicles in the roadway of any street, or of pedestrians upon the sidewalk portions thereof, or to hang over such portions of such sidewalk within seven feet of the surface thereof.

Sec. 29. Sub-division 6. Cutting Trees. It shall be unlawful for any person to cut or permit the cutting of any tree or the roots or branches thereof being or growing upon any street in said City, or be in any manner injure or impair the growth or life thereof, without first obtaining a permit to do so from the Board of Trustees or the Tree Warden, or Tree Commission: provided that nothing herein shall prevent the proper trimming of trees as provided in Subdivision 3 hereof.

Article X, Sec. 80. Appointment of Commission. There is hereby established a Tree Commission, to consist of three members to be appointed by the Board of Trustees and to serve at the pleasure of the Board, and the executive officer of such Commission shall be known as the Tree Warden.

Sec. 81. Power and Authority. Said Commission is hereby vested with power and authority to take charge of and supervise the care and maintenance of all public parks and the planting, trimming and removing of all trees upon the street and public places of the City.

Sec. 82. Planting of Trees. Said Commission and said Board of Trustees, or either of them shall have the right to direct the kind and variety of trees to beplanted upon any of said streets, and it shall be unlawful for any person to plant upon any such street any trees without first obtaining a permit so to do from said Commission or said Board of Trustees.

Sec. 83. Trimming and Cutting without Permit. It shall be unlawful for any person to trim, cut, mulitate, or injure any tree, or the roots or branches thereof, or injure or impair the growth or life thereof, or to place or install upon any street any telephone pole, electric light, trolley, or power pole within six feet of the trunk of any tree growing upon such street without a permit so to do first obtained from said Tree Warden, or said Commission, or said Board of Trustees; provided, that nothing herein shall prevent a proper trimming of trees to prevent obstruction to pedestrians or public travel, as required by Subdivision 5 of Section 29 of this Ordinance.

Article XIX, Sec. 288. Failure or Neglect to Plant Trees, When Unlawful. Whenever the Tree Commission or Board of Trustees shall grant to any person permission to remove any trees growing upon any public street, conditioned upon planting other trees in places thereof, it shall be unlawful for such person to fail or neglect to so plant such other trees within the times fixed for such planting by said Commission or said Trustees.

Article IX - Animals Sec. 30. Sub. 2. Tying animals to trees. It shall be unlawful for any person :- To tie or permit to be tied, any such animals to any shade or ornamental tree upon any sidewalk or street therein; or to be so tied that such animal can graze upon such sidewalk or street.

It will be noted that in the Ordinances in force in Redlands and Riverside, provision is made for planting by city authorities. In this one fact, more then in any other single feature lies the success of the plantinge in those towns. The City of San Bernardino has an excellent ordinance but it does not vest definite

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authority for planting in the hands of one officer or set of officers. The result has been that only the negative advantages of their ordinance have become apparent.

Many other instances may be cited of towns where insufficient legislation defeats the value of such articles as may be in force.

Often the only mention of trees to be found in the Statute Books will be an ordinance forbidding the planting of certain species within definite distances from the water and sewer pipes. Often times defective piping causes the difficulty by allowing easy entrance to the roots of trees. It cannot be disputed that the roots of trees, some more than others, will turn in search of water toward the pipes. This is especially true where there is any leakage, however slight, at any of the joints.

The town of Oroville has made most extensive study of this matter and has a large list of trees which may not be used in the Oroville streets because of difficulty in roots seeking the water. It is to be hoped that the town will take up the matter of tree planting along the best lines with the same enthusiam that has been shown in blacklisting certain offending trees.

As an example of the means used to enforce popular attention, the following "Warning" may be of interest. The Los Angeles County Board of Forestry has made considerable progress in their planting schemes and have ambitious plans for future work.

W A R N I N G

DO NOT CUT OR TRIM TREES ALONG COUNTY ROADS.

The Board of Forestry of Los Angeles County, duly created and organized, desires to call attention to the following provisions quoted from the law authorizing county boards of forestry, and prescribing the powers, duties, and jurisdiction of such boards. It is especially desirable that the public appreciate the necessity of securing permits before any cutting or planting of trees is under-

authority for planting in the hands of one officer or set of officers. The result has been that only the negative advantages of their ordinance have become apparent.

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taken on the county road and highways. The Board will appreciate the co-operation of the public in its work for the improvement of the County roads and highways, and will be especially glad to have unpermitted cutting of trees on these roads and highways called to its attention.

Chapter 729 - LAWS OF THE STATE OF CALIFORNIA.
APPROVED APRIL 28, 1909.

An act to provide for the protection of shade and ornamental trees growing and to be grown upon the roads, highways, grounds and property within the State of California; and for the planting, care, protection and preservation of shade and ornamental trees, hedges, lawns, shrubs and flowers growing and to be grown in and upon such roads, highways, grounds and property; and to create county boards of forestry for such purposes; ..... and to empower such boards to enforce all laws and adopt and enforce any and all lawful and reasonable rules for the portection, planting, regulation, preservation, care and control of such shade and ornamental trees, hedges, lawns, shrubs and flowers.

Section 7. The county boards of forestry ..... within their respective counties, may plant trees or cause the same to be planted, shall have exclusive power over and jurisdiction to decide upon the variety, kind and character of trees, hedges and shrubs that shall be planted upon said roads, highways, grounds and property; and to determine all questions respecting the pruning, cutting and removal of any trees, hedges and shrubs now growing and to grow thereon and the necessity therefor and the extent and the manner in which said work shall be done;
.....

Section 8. It shall be unlawful for any person or corporation ..... to trim, prune, cut, deface, destroy or remove any shade or ornamental tree, hedge, or shrub growing or to grow upon such road, highway, ground or property or to paint, place, attach to or put upon any such trees, hedges or shrubs any sign, notice, advertisement or advertising device without the consent in writing of the board (County Board of Forestry) first obtained, or to plant any tree, hedge or shrub on any such road, highway, ground or property withous such written consent.

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paint, place, attach to or put upon any such trees, hedges or shrubs any sign,
notice, advertisement or advertising device without the consent in writing of the
board (County Board of Forestry) first obtained, or to plant any tree, hedge or
shrub on any such road, highway, ground or property without such written consent.

Section 9. Every person who shall violate any of the provisions of this act, shall be guilty of a misdemeanor.

Section 12. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

For permits or information apply to

LOS ANGELES COUNTY BOARD OF FORESTRY

HALL OF RECORDS.

Not all of the counties of the State have taken advantage of the opportunity given in the State Law and there are many roads freely travelled which would add much to the beauty of our State, if they were well planted.

As a matter of interest the laws of New Jersey and Penneylvania are appended in full. These states have been the pioneers in this work and offer good examples of effective legislation.

NEW JERSEY

Laws of New Jersey.

General Public Laws; Session of 1893.

Chapter CCLXXXV.

AN act to provide for the planting and care of shade-trees on the highways of the municipalities of this State.

Section 1. BE IT ENACTED by the Senate and General Assembly of the State of New Jersey, That in all the municipalities of this State there may be appointed in the manner hereinafter provided, a commission of three freeholders, who shall serve without compensation, and who shall have the exclusive and absolute control and power to plant, set out, maintain, protect and care for shade-trees in any of the public highways of their respective municipalities, the cost thereof to be borne and paid for in the manner hereinafter directed.

Section 2. And be it enacted, That it shall be optional with the governing body of any municipality whether this act shall have effect in, and such commissioners shall be appointed in, such municipality; and when any such governing body

shall by resolution approve of this act and direct that such commissioners shall be appointed, then, from that time this act and all its provisions shall be in force and apply to such municipality, and such commissioners shall be appointed for terms of three, four, and five years respectively; and on the expiration of any term, the new appointment shall be made for five years, and any vacancy shall be filled for the unexpired term only; and in cities, the said appointments shall be made by the mayor thereof, and in townships by the chairman of the township committee, and in villages and boroughs by the chairman or president of the board of trustees or other governing body.

Sec. 3. And be it enacted, That whenever said commissioners shall propose to make any such improvements as setting out or planting any shade-trees, or changing the same in any highways, they shall give notice of such contempleted improvement (specify the streets or portions thereof where such trees are intended to be planted) in one or more newspapers of their said municipality, if there be any newspapers published in said place, for at least two weeks prior to any meeting, in which they shall decide to make such improvement.

Sec. 4. And be it enacted, That the cost of planting and transplanting any trees in any highway, and boxes or guards for the protection thereof, when necessary, shall be borne by the real estate in front of which such trees are planted or set out, and the cost thereof as to each tract of real estate shall be certified by said commissioners to the person having charge of the collection of taxes for said municipality; and upon the filing of said certificate, the amount of the cost of said improvement shall be and become a lien upon said lands in front of which the trees were planted or set out, and the said collecting officer shall place the assessment so made against any property in the annual tax bills rendered to owner or owners of such property, and the same shall be collectible in the same manner as the other taxes against said property are collected.

Sec. 5. And be it enacted, That the cost and expense of caring for said

shall by resolution approve of this act and direct that such commissioners shall be appointed, then, from that time this act and all its provisions shall be in force and apply to such municipality, and such commissioners shall be appointed for terms of three, four, and five years respectively; and on the expiration of any term, the new appointment shall be made for five years, and any vacancy shall be filled for the unexpired term only; and in cities, the said appointments shall be made by the mayor thereof, and in townships by the chairman of the township committee, and in villages and boroughs by the chairman or president of the board of trustees or other governing body.

Sec. 3. And be it enacted, That whenever said commissioners shall propose to make any such improvements as setting out or planting any shade-trees, or changing the same in any highways, they shall give notice of such contemplated improvement (specify the streets or portions thereof where such trees are intended to be planted) in one or more newspapers of their said municipality, if there be any newspaper published in said place, for at least two weeks prior to any meeting, in which they shall decide to make such improvement.

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Sec. 5. And be it enacted, That the cost and expense of caring for said

trees, after being planted or set out, and the expense of publishing said notices, shall be borne and paid by a general tax to be raised by said municipality; said tax shall not exceed the sum of one-tenth of one mill on the dollar annually on all the taxable property of said municipality, and the needed amount shall be each year certified by said commissioners to the assessor, and assessors of said municipality, and be assessed and raised as other taxes.

Sec. 6. And be it enacted, That this act shall take effect immediately. Approved March 28, 1893.

Under Chapter 169, Section 97 of the laws of 1899, this act was repealed in so far as it related to or affected townships.

This act was amended in the years 1905 and 1906 so as to extend the jurisdiction of the shade-tree commissions over the public parks, and to give the commissions the power to pass ordinances for the protection of shade-trees on the public streets and in the public parks.

Laws of New Jersey of 1905.

Chapter 108.

A supplement to an act entitled "An act to provide for the planting and care of shade-trees on the highways of the municipalities of this state," approved March twenty-eighth, one thousand eight hundred and ninety-three.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

Section 1. In any municipality which now has or hereafter shall take advantage of the act to which this is a supplement the commission appointed under the provisions thereof shall have exclusive control over the public parks belonging to or under the control of such municipality, or any department in the government thereof, with full power and authority to improve, repair, manage, maintain, and control the same.

Sec. 2. The said commission shall have full power and authority and is hereby empowered to pass, enact, alter, amend, and repeal ordinances for the protection, regulation, and control of such parks, and the trees, flowers, shrubs,

trees, after being planted or set out, and the expense of publishing said notices, shall be borne and paid by a general tax to be raised by said municipality; said tax shall not exceed the sum of one-tenth of one mill on the dollar annually on all the taxable property of said municipality, and the needed amount shall be each year certified by said commissioners to the assessor, and assessors of said municipality, and be assessed and raised as other taxes.

Sec. 6. And be it enacted, That this act shall take effect immediately.

Approved March 28, 1893.

Under Chapter 109, Section 97 of the laws of 1899, this act was repealed in so far as it related to or affected townships.

This act was amended in the years 1898 and 1902 so as to extend the jurisdiction of the shade-tree commissions over the public parks, and to give the commissions the power to pass ordinances for the protection of shade-trees on the public streets and in the public parks.

Laws of New Jersey of 1903.

Chapter 108.

A supplement to an act entitled "An act to provide for the planting and care of shade-trees on the highways of the municipalities of this state," approved March twenty-eighth, one thousand eight hundred and ninety-three.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

Section 1. In any municipality which now has or hereafter shall take advantage of the act to which this is a supplement the commission appointed under the provisions thereof shall have exclusive control over the public parks belonging to or under the control of such municipality, or any department in the government thereof, with full power and authority to improve, repair, manage, maintain, and control the same.

Sec. 2. The said commission shall have full power and authority and is hereby empowered to plant, cause, alter, amend, and repeal ordinances for the protection, regulation, and control of such parks, and the trees, flowers, shrubs,

statuary therein, and also for the protection, regulation, and control of all shade-trees planted or growing upon the public highways of any such municipality, and to prescribe fines and penalties for the violation thereof and fix the amount of the same; the method now in use for the passing, enacting, altering, amending, and publiching ordinances in said municipality shall be the method used to pass, enact, alter, amend, repeal, and publish the ordinances therein mentioned.

Sec. 3. All moneys collected from fines or penalties for the violation of any ordinances of any such commission, and all moneys collected for assessments made upon the property for the cost of planting and transplanting any trees; and the boxes or guards for the protection thereof in any such city, shall be forth-with paid over to the proper municipal authorities and shall be placed to the credit of the said commission and subject to be drawn upon by the said commission in the manner provided by law for the payments of moneys in any such municipality.

Sec. 4. All acts and parts of acts inconsistent with this act are hereby repealed.

Sec. 5. This act shall take effect immediately.

Approved April 6, 1905.

Laws of New Jersey of 1906.

Chapter 186.

A supplement to an act entitled "An act to provide for the planting and care of shade-trees on the highways of the municipalities of this state, approved March twenty-eighth, one thousand eight hundred and ninety-three."

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

Section 1. The said commission may prescribe penalties for the violation of any of their ordinances, and the courts which now or hereafter shall have jurisdiction over actions for the violation of ordinances of the municipality in which said commission has been or shall be appointed shall have jurisdiction in actions for the violation of such ordinances as the said commission shall enact;

ctuary thereln, and also for the protection, regulation, and control of all
shade-trees planted or growing upon the public highways of any such municipality,
and to prescribe fines and penalties for the violation thereof and fix the amount
of the same; the method now in use for the passing, enacting, altering, amending,
and publishing ordinances in said municipality shall be the method used to pass,
enact, alter, amend, repeal, and publish the ordinances therein mentioned.

Sec. 3. All money collected from fines or penalties for the violation of
any ordinance of any such commission, and all money collected for assessments
made upon the property for the cost of planting and transplanting any trees; and
the boxes or guards for the protection thereof in any such city, shall be forth-with
paid over to the proper municipal authorities and shall be placed to the credit
of the said commission and subject to be drawn upon by the said commission in the
manner provided by law for the payments of moneys in any such municipality.

Sec. 4. All acts and parts of acts inconsistent with this act are hereby
repealed.

Sec. 5. This act shall take effect immediately.

Approved April 6, 1906.

Laws of New Jersey of 1906.

Chapter 186.

A supplement to an act entitled "An act to provide for the planting and
care of shade-trees on the highways of the municipalities of this state, approved
March twenty-eighth, one thousand eight hundred and ninety-three."

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

Section 1. The said commission may prescribe penalties for the violation
of any of their ordinances, and the courts which now or hereafter shall have
jurisdiction over actions for the violation of ordinances of the municipality
in which said commission has been or shall be appointed shall have jurisdiction in
actions for the violation of such ordinances as the said commission shall enact;

and said ordinances shall be enforced by like proceedings and processes, and the practice for the enforcement of said ordinances shall be the same as that provided by law for the enforcement of the ordinances of the municipality in which such commission exists.

Sec. 2. The officers authorized by law to serve and execute processes in the courts, as aforesaid, shall be the officers to serve and execute any process issued out of any court under this act.

Sec. 3. A copy of any ordinance or ordinances of said commission, certified to under the hand of the clerk, secretary, or president of the said commission, shall be taken in any court of this State as full and legal proof of the existence of such ordinance or ordinances, and that all requirements of law in relation to the ordaining, publishing, and making of the same, so as to make it legal and binding, have been complied with, unless the contrary be shown.

Sec. 4. This act shall take effect immediately.

Approved May 2, 1906.

Laws of New Jersey of 1906.

Chapter 245.

An act in relation to the control of public parks belonging to or under the control of any muncicipality of this State or any department in the government thereof:

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

Section 1. In any municipality which now has or hereafter shall take advantage of an act entitled, "An act to provide for the planting and care of shade-trees on the highways of the municipalities of this State, approved March twenty-eighth, one thousand eight hundred and ninety-three," the commission appointed under the provisions of said act shall have exclusive control of the public parks belonging to or under the control of such municipality or any department in the government thereof, with full power and authority to improve,

repair, manage,maintain, and control the same.

Sec. 2. The said commission shall have full power and authority and is hereby empowered to pass, enact, alter, amend, and repeal ordinances for the protection, regulation, and control of such parks and the trees, flowers, shrubs, statuary, and other improvements therein, and to prescribe fines and penalties for the violation thereof and to fix the amount of the same. The method now or hereafter in use for the passing, enacting, altering, amending, repealing, and publishing ordinances in said municipality shall be the method used to pass, enact, alter, amend, repeal, and publish the ordinances herein mentioned, and said ordinances shall be enforced in the manner provided at the time of said enforcement by law for the enforcement of the ordinances of the commission authorized by the afresaid act and any amendments or supplements thereof.

Sec. 3. This act shall take effect immediately.

Approved May 17, 1906.

In the years 1907, 1908, and 1910, the shade-tree law of 1893 was further amended. Under Chapter 156 of the laws of 1907, Section 1 was amended making it optional with the governing body of any municipality to increase the number of members of the commission to five. Chapter 151 of the laws of 1908 amended section 2 so as to make it "optional with the body or board having charge of the finances of any municipality" whether the act of 1893 shall become effective. Under Chapter 198 of the laws of 1908 and Chapter 167 of the laws of 1910, the law of 1893 was amended as follows: "In any city or town in this state in which a park commission now exists, the governing body invested with the power of adopting the act to which this is a supplement, may, in the resolution adopting said act, provide that the said park commission shall also act as a shade-tree commission; and the act to which this is a supplement, and the amendments thereof and supplements thereto, shall take effect in said city or town, except that no independent shade-tree commission shall be appointed."

repair, manage, maintain, and control the same.

Sec. 2. The said commission shall have full power and authority and is hereby empowered to pass, enact, alter, amend, and repeal ordinances for the protection, regulation, and control of such parks and the trees, flower, shrubs, statuary, and other improvements therein, and to prescribe fines and penalties for the violation thereof and to fix the amount of the same. The method now or hereafter in use for the passing, enacting, altering, amending, repealing, and publishing ordinances in said municipality shall be the method used to pass, enact, alter, amend, repeal, and publish the ordinances herein mentioned, and said ordinances shall be enforced in the manner provided at the time of said enforcement by law for the enforcement of the ordinances of the commission authorized by the aforesaid act and any amendments or supplements thereof.

Sec. 3. This act shall take effect immediately.

Approved May 17, 1906.

In the years 1907, 1908, and 1910, the shade-tree law of 1893 was further amended. Under Chapter 136 of the laws of 1907, Section 1 was amended making it optional with the governing body of any municipality to increase the number of members of the commission to five. Chapter 131 of the laws of 1908 amended section 2 so as to make it "optional with the body or board having charge of the finances of any municipality" whether the act of 1893 shall become effective. Under Chapter 198 of the laws of 1908 and Chapter 167 of the laws of 1910, the law of 1893 was amended as follows: "In any city or town in this state in which a park commission now exists, the governing body invested with the power of adopting the act to which this is a supplement, may, in the resolution adopting said act, provide that the said park commission shall also act as a shade-tree commission; and the act to which this is a supplement, and the amendments thereof and supplements thereto, shall take effect in said city or town, except that no independent shade-tree commission shall be appointed."

PENNSYLVANIA

Laws of Pennsylvania

Session of 1907.

An act to provide for the planting and care of shade-trees, on highways of townships of the first class, boroughs, and cities of the Commonwealth of Pennsylvania, and providing for the cost thereof.

Section 1. BE IT ENACTED, etc., That in townships of the first class, boroughs,, and cities of Commonwealth of Pennsylvania, there may be appointed, in the manner hereinafter provided, a Commission of three freeholders, to be known and designated as the Shade-Tree Commission of said township, borough, or city, who shall serve without compensation, and who shall have exclusive and absolute custody and control of, and power to plant, set out, remove, maintain, protect, and care for shade-trees, on any of the public highways of the said townships, boroughs, and cities, the cost thereof to be provided for in the manner hereinafter stated: Provided, That in townships, boroughs, or cities in which a Commission for the care of public parks shall have been created, said Commission shall, upon the acceptance of this act as provided in section two, be charged with the duties of the Commission as above provided, and shall, for that purpose, be possessed of all the powers herein mentioned and granted.

Sec. 2. The commissioners of any township of the first class, or the council of any borough or city, in case of the commissioners, or by joint resolution in the case of the councils, accept the provisions of this act; and when such majority vote or joint resolution shall have been duly passed and approved, and such Shade-Tree Commissioners appointed, or, in their stead, the duties and powers herein provided have been devolved upon an existing park commission, then, from that time and in that event, this act and all its provisions shall be in full force and application in such township of the first class, borough, or city, so accepting; and such commissioners shall be appointed, for terms of three, four and five years, respectively, and, on the expiration of any term, the new appointment shall be for

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five years, and any vacancies shall be filled for the unexpired term only; and in townships of the first class the said appointment shall be made by the commissioners thereof; and in boroughs, by the chief burgess, and in cities, by the mayor thereof; Provided, That in cities where ia Commission exists for the care of public parks, the term and appointment of such Commission shall not be changed by this act, but shall be and remain as provided by the act of the Assembly, and by the ordinance of councils creating such commission for the care and maintenance of public parks. And such Shade-tree Commission shall, twice in every year, report in full its transactions and expenditures for the municipal fiscal year then last ended, to the authority under and by which it was appointed; Provided, That an existing park commission, acting under this enactment, may embody its report in its regular report to the councils, as by law or ordinance provided.

Sec. 3. That when such Shade-Tree Commissioners, or Park Commissioners so acting, shall propose the setting out or planting or removing of any shade-trees, or the material changing of the same in any highway, they shall give public notice of the time and place appointed for the meeting at which such contemplated work is to be considered, specifying in detail the highways, or portion thereof, upon which trees are proposed to be planted, removed, or changed, in one or more - not exceeding two in all - of the newspapers published in said township, borough, or city once each week for at least two weeks prior to the date of said meeting.

Sec. 4. The cost of planting, transplanting, or removing any trees in any highway, and of suitable guards, curbing, or grating, for the protection thereof when necessary, and of the proper replacing of any pavement or sidewalk necessarily disturbed in the doing of such work, shall be borne by the owner of the real estate in front of which such trees are palnted, set out, or removed; and the cost thereof as to each tract of real estate shall be certified by the commissioners to the township commissioners, or to the presidents of the councils in boroughs and cities, and also to the person having charge of the collection of taxes, for the said township, borough, or city; and upon the filing of said ceritifcates, the amount of the

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cost of such improvements, of which notice shall be given to each property-owner involved, accompanied with a copy of the aforeaid certificate, together with a notice of the time and place for payment, shall be and necome a lien upon said real estate, in front of which said trees have been planted, set out, or removed; said lien to be collectable, if not paid in accordance with notice as herein provided, in the same manner as other liens for taxes are now collectible against the property involved.

Sec. 5. The cost and expense of caring for said trees after having been planted or set out, and the expanse of publishing the notices provided for in section three, shall be borne and paid for by a general tax, to be levied annually in the manner that taxes for township, borough, and city purposes are now levied in such townships of the first class, boroughs, or cities; such tax not to exceed the sum of one-tenth of one mill on the dollar on the assessed valuation of the property in such townships of the first class, boroughs, or cities; and the needed amount shall each year, in due time be certified by the Shade-Tree Commissioners to the proper authorities charged with the assessment of taxes in said townships, boroughs, or cities, to be assessed and paid, as other taxes are assessed and paid, and to be drawn against as required by said commissioners, in the same manner as moneys appropriated for township, borough, or city purposes are now drawn against in said twonships, boroughs, or cities; Provided, That the commissioners of any township of the first class, and the councils of any borough or city, accepting the provisions of this act, may provide for the expense of the maintenance of trees on highways, in accordance with the provisions of this section by actual appropriation, equal to the amount certified to be required by the said Commission, in lieu of the specific assessment above authorized.

Sec. 6. The Commission, under which the provisions of this act shall be carried out, in any township of the first class, borough, or city, shall have power to employ and pay such superintendents, engineers, foresters, tree-wardens,

cost of such improvements, of which notice shall be given to each property-
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with a notice of the time and place for payment, shall be and become a lien
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or removed; said lien to be collectable, if not paid in accordance with notice
as herein provided, in the same manner as other liens for taxes are now collect-
able against the property involved.

Sec. 8. The cost and expense of caring for said trees after having been
planted or set out, and the expense of publishing the notices provided for in
section three, shall be borne and paid for by a general tax, to be levied
annually in the manner that taxes for township, borough, and city purposes are
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with the provisions of this section by actual appropriation, equal to the
amount certified to be required by the said Commission, in lieu of the specific
assessment above authorized.

Sec. 9. The Commission, under which the provisions of this act shall be
carried out, in any township of the first class, borough, or city, shall have
power to employ and pay such superintendents, engineers, foresters, tree-wardens,

or other assistants, as the proper performance of the duties devolving upon it shall require; and to make, publish, and enforce regulations for the care of, and to prevent injury to trees, on the highways of any township, borough, or city accepting the provisions of this act; and to assess suitable fines and penalties for violations of this act, provided such regulations shall have been published at least twice in one or more, not exceeding two, newspapers of the township, borough, or city involved, after having been submitted to and being approved by the commissioners of the township of the first class, or the councils of the borough or city affected; and such fines and penalties, so assessed for violations of this act, shall become liens upon the real property of the offender, and be collectible by the constituted authorities as liens for taxes upon real property are now collected.

Sec. 7. All the moneys due and collected from fines or penalties or assessments, in consequence of the acts of said Shade-Tree Commission in enforcing this act, shall be paid to the treasurers of the townships, boroughs, and cities accepting its provisions, and shall be placed to the credit of said Commission, subject to be drawn upon by the said Commission for the purposes of this act.

Sec. 8. All acts and parts of acts inconsistent with this act are hereby repealed.

Sec. 9. This act shall take effect immediately; but its provisions shall not be and become binding upon any township, borough, or city until it has been duly accepted, as provided in section two.

Approved. - The 31st day of May, A.D. 1907.

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